

ROYAL BOTANIC GARDENS, KEW.

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BULLETIN

OF

MISCELLANEOUS INFORMATION.

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No. 10]

[1919

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XXVIII.—THE NEW FLAGSTAFF AT KEW.

(WITH PLATES.)

The long-awaited erection of the new flagstaff was successfully accomplished on October 18th last, the mast reaching the vertical position at 3 p.m. The hoisting had commenced early on the morning of the previous day.

For more than fifty years—that is to say from 1861 to 1913—a conspicuous landmark in Kew had been a flagstaff of Douglas fir standing on the mound south of the Berberis Dell. It was given to the Gardens by Mr. Edward Stamp, an importer of American timber, and was 159 ft. high, being of course in one piece. Its age was calculated to be 250 years, its height as it stood in the forest 180 ft., and its weight, after shaping,  $4\frac{1}{2}$  tons.

It may be recorded that another flagstaff of smaller dimensions had been presented to Kew by Mr. Stamp in 1859. But ill-fortune pursued this specimen. As it was being towed up the Thames, towards Kew, it was cut in two by a tug. The pieces were afterwards spliced together and safely transported to the appointed site in Kew, but its erection was entrusted to people who were evidently inexpert at such work. As it was in process of being hoisted, a violent gust of wind blew over the pole, apparatus and all, which came crashing to the ground, with the result that Mr. Stamp's gift lay there broken into three pieces. Kew, however, rather gained than lost by this mishap, for the new pole presented by Mr. Stamp was a larger and better sample. In the hands of professional mast-riggers from Deptford Dockyard this was successfully erected in 1861, and there it stood for thirty-five years. In 1895, however, it was seen to be decayed at the base and on being examined by Admiralty officials was reported by them to be unsafe. In the opinion of experts it was still possible to preserve it by removing the decayed base and splicing on a new one. This was done by Messrs. Robinson and Dodd, of Poplar, who lowered it, did the repairs, and re-hoisted it on February 4th, 1896. The new base of the pole was of pitch pine, and of sufficient length to retain the flagstaff at its original height.

These repairs gave the pole a renewed term of existence, but in

1913 the workmen engaged in giving it its periodical coat of varnish reported that in many parts dry rot had set in and that it could no longer be considered safe. It was, in consequence, taken down, when it was seen to be so badly decayed that further repair was out of the question. And so came to an end the flagstaff of 1861, up to then the finest of its kind in Europe.

The flagstaff had not long been lying on the ground when the following letter was received by the Director from Mr. J. H. Turner, Agent-General for British Columbia. This and the three following letters form the opening pages of the history of the new flagstaff, and it is of considerable interest that Mr. Turner knew Mr. Stamp, and was in British Columbia when the first flagstaff was sent over.

Office of the Agent-General for British Columbia,  
17th December, 1913.

Lt.-Col. Sir D. Prain, C.M.G.

Dear Sir,

The British Columbia Flagstaff at Kew Gardens, I learn from the newspapers, has been blown down. It is a somewhat singular coincidence that on the 22nd October, I wrote to Sir Richard McBride, Premier of British Columbia, suggesting to him that the Provincial Government should obtain a really good specimen of a British Columbia tree for a flagstaff and ship home to London. It would be a comparatively easy matter to get one at least 200 ft. or over in length. I am indeed informed that quite recently a fine specimen, 220 ft. in length has been erected in Vancouver City.

When I wrote to the Premier about it, I had not heard of the misfortune at Kew. My idea was to have a fine Douglas Pine or Cedar erected in one of the London parks. The principal difficulty in the matter is the transit to England, very few owners of vessels like to take timber of such proportions.

I should very much like to know what is the condition of the Kew flagstaff, as I was in British Columbia some 50 years ago when it was shipped to this country, and I knew Captain Stamp, the shipper, somewhat intimately.

Yours faithfully,

(Signed) J. H. TURNER.

Agent-General for British Columbia.

Office of the Agent-General for British Columbia,  
8th January, 1914.

Lt.-Col. Sir D. Prain, C.M.G.

Dear Sir,

I thank you very much for your letter of the 19th ultimo, respecting the Flagstaff at Kew, and for the interesting information you append to it, being a copy of a paragraph which appeared

in the Bulletin of the Royal Gardens, Kew, March and April, 1896. I am sending a copy of this out to-day to the Hon. Sir Richard McBride, with a view to interesting him in my suggestion that the Province should present another Spar to the Gardens, and I am in hopes he will bring it before the great Timber Concerns of the Province, and induce them to select a really good one.

As an old lover of Kew Gardens, it would be a great pleasure to me to be able to inform you that the people of British Columbia were determined to be well represented in that respect in your beautiful Gardens.

Yours faithfully,

(Signed) J. H. TURNER,  
Agent-General for British Columbia.

Office of the Agent-General for British Columbia,  
23rd February, 1914.

Lt.-Col. Sir D. Prain, C.M.G.

Dear Sir,

Referring to the Agent-General's letter to you of the 17th December last and your reply, *re* the Kew Gardens Flagstaff, a communication has to-day been received from the Hon. W. R. Ross, K.C., Minister of Lands, British Columbia, informing the Agent-General that a flagstaff could be obtained in British Columbia which would be in the neighbourhood of 225 ft. in height, asking further whether such a flagstaff would be acceptable to the Authorities of the Royal Botanic Gardens.

Yours faithfully,

(Signed) J. A. TURNER,  
Secretary.

Royal Botanic Gardens, Kew,  
February 25th, 1914.

Dear Sir,

I am desired by the Director to acknowledge the receipt of your letter of 23rd February, informing us that a communication has been received from the Hon. W. R. Ross, K.C., Minister of Lands, British Columbia, to the effect that a flagstaff of some 225 ft. in height could be obtained in British Columbia, and asking if such a flagstaff would be acceptable for the Royal Botanic Gardens.

The Director requests me to say that a flagstaff of about the height mentioned would be very acceptable and would form a most striking and interesting feature in the Royal Botanic Gardens, Kew.



He begs to express his warm appreciation of the kind interest taken by the Agent-General and by the Minister of Lands in this matter.

I am,

Yours faithfully,

(Signed) ARTHUR W. HILL,

Assistant Director.

The Secretary,

Agent-General for British Columbia,

Salisbury House,

Finsbury Circus, E.C.

From this date onwards the matter was taken up enthusiastically.

The forests of British Columbia were searched by skilled woodmen until a tree was found that fulfilled the exacting ideals of the searchers, but not, we are told, until eleven trees had been felled that failed to satisfy their requirements. They found it some thirty miles north of the City of Vancouver. Like its predecessor that provided the old flagstaff at Kew, this tree also was a Douglas fir (*Pseudotsuga Douglasii*, Carrière), a conifer first discovered in 1793 by Archibald Menzies, the surgeon and botanist who accompanied Vancouver on his famous voyage of survey, and first introduced to England by David Douglas in 1827. It may be mentioned in passing that, growing at Scone in Perthshire, Douglas's birthplace, is a tree of his original introduction, now a beautiful specimen over 100 ft. high. It was planted where it now stands in 1834.

After the tree was felled, its limbs lopped off and its length reduced to about 220 ft. (as it stood in the forest it had been probably between 280 ft. and 300 ft. high) it was conveyed by rail and water to the City of Vancouver, and there shaped to its present form by expert axemen. It is square at the base for 15 ft. up, then octagonal up to 157 ft., and thence to the summit (214 ft.) it is round. It will be of interest to put on record its diameters at various heights. They are as follows:—Base 33 ins., 16 ft. up 33 ins., 52 ft. up  $29\frac{3}{8}$  ins., 89 ft. up  $25\frac{3}{8}$  ins., 115 ft. up  $22\frac{1}{2}$  ins., 152 ft. up 19 ins., 190 ft. up 15 ins., 214 ft. up (summit) 12 ins.

The pith is not in the centre but  $5\frac{1}{2}$  ins. from one side at the butt end. From the pith to the other margin there are 360 annual rings. The first 100 rings take up  $17\frac{3}{4}$  ins., the second 100 rings  $7\frac{5}{8}$  ins., and the next 100 rings are compressed into  $3\frac{1}{2}$  ins. From these measurements Mr. J. S. Gamble infers "that the tree was a dominant one for about one hundred years, putting on diameter increment; then the surrounding crop caught it up and passed it, so that it increased in length to compete with them at the expense of its thickness. It clearly kept its place with them to the end and must have been closely surrounded, but having had the advantage of light when young was sturdier and stronger, so was probably selected as the finest of the crop."

The tree was 6 ft. in diameter at the base when felled and practically all the sapwood was taken off in the shaping. It is estimated to have been 400 years old. Its weight, after shaping, was roughly 18 tons, about four times that of the old flagstaff.

The problem of transporting it to Kew had now to be faced. A compact weight of 18 tons is of course trifling, but 18 tons spread over a length of 214 ft. of damageable material is not so easily dealt with. The Directors of the Shire line of Steamers undertook the task of conveying it from Vancouver to the River Thames. The Great War had broken out since the enterprise was initiated in the spring of 1914, and it was not until November 8th, 1915, that the s.s. *Merionethshire* left British Columbia with the staff safely laid along her decks. It had been lifted by means of a pile driver and a crane and slid on board from behind the vessel.

The *Merionethshire* arrived safely at the London Docks on December 29th, 1915, and dropped the flagstaff into the Thames. It was soon after towed up the river by a tug and moored to the bank opposite the end of the Sion Vista. Here the Royal Botanic Gardens accepted delivery. A fortunate high tide enabled our staff a few days later to haul it from the river on to the towing path. It was then rolled over the Ha-Ha on stout beams into the Gardens, and by means of rollers, planks and hauling tackle was conveyed by an intricate route to the foot of the mound on which it was to be erected. Thus, after many adventures, it arrived perfectly safe and sound at its destination. Here was lying, derelict and time-worn, its predecessor of 1861, and the two alongside each other made a very striking contrast in bulk and length.

At this time, the early part of 1916, the Government and nation had something more serious on hand than such matters as the flagstaff, so its erection had to remain in abeyance until after the day of armistice. A further delay of  $2\frac{1}{2}$  years was the result, but this was not without its advantages. The pole as it laid along the ground was a source of pride to Canadians over here and an object of great interest to home visitors who were able to appreciate fully its magnificent size and length. It also enabled the wood to be treated thoroughly and conveniently with antiseptic dressings.

An attempt to arrange for the erection of the flagstaff had been made in July, 1917, when Mr. Turner, Agent-General for British Columbia, wrote to the Canadian Forestry Battalion asking them if they would be prepared to undertake the work.

In reply the Canadian Forestry Battalion expressed their readiness to erect the flagstaff, but subsequently they found themselves obliged to postpone the task owing to the urgency of their war work.

The signature of an armistice on November 11th, 1918, permitted attention to be turned once more to the problem of the erection of the flagstaff, and in continuation of the correspondence with the Agent-General in July 1917, a letter was addressed to Mr. Turner on December 18th, 1918.

To this the following reply was received:—



Office of the Agent-General for British Columbia,  
19th December, 1918.

Captain A. W. Hill.

Dear Sir,

I have your letter of the 18th inst., directed to Mr. Turner, who has retired from the Agent-Generalship of British Columbia.

Some weeks ago I took up the question of raising the flagstaff with Brig.-General McDougall . . . and he has promised to undertake the task with the assistance of his Engineers and Forestry Brigade. After I have had a further opportunity of arranging the details with General McDougall, I will write you again.

Yours faithfully,

(Signed) F. C. WADE,

Agent-General for British Columbia.

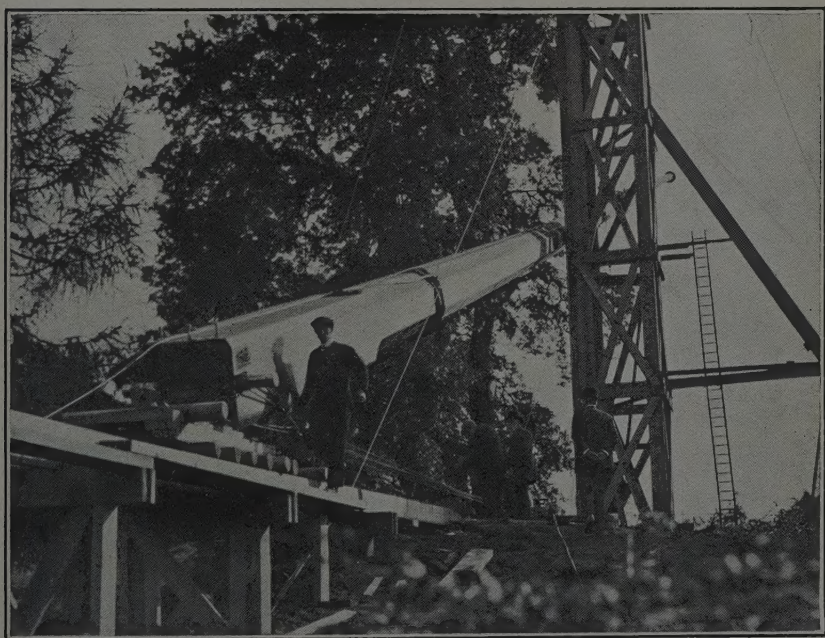
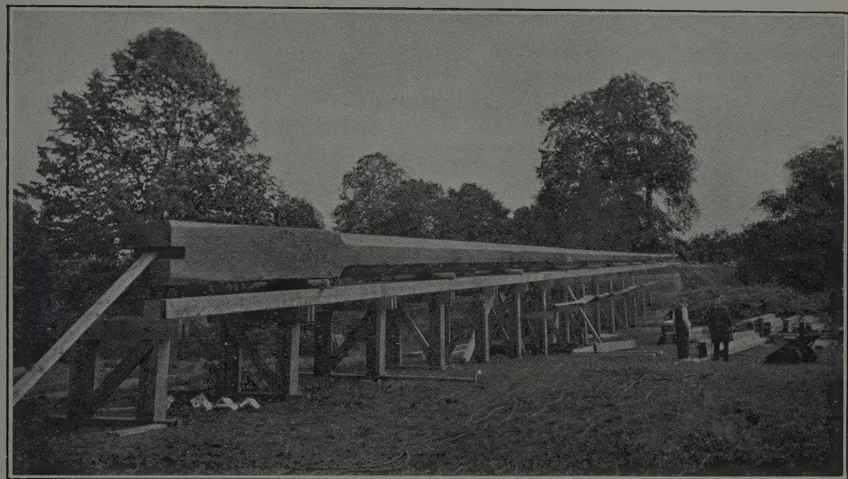
Thanks to Mr. Wade's keen interest and enthusiasm the services of several Engineer officers attached to the Canadian Forestry Corps in Europe were secured, and under their direction four huge blocks of concrete were set in the earth to which the guide-ropes of the flagstaff were to be attached. But, beyond this, the Canadians were not able to proceed. Some of them were recalled and some were given other duties, the upshot being that the problem of its erection devolved on H.M. Office of Works. The Board secured the services of Messrs. Coubro and Scrutton, professional mast-riggers, of 18, Billiter Street, E.C., by whose consulting engineer, Mr. H. Tooley, the whole operation was planned.

The task was successfully accomplished on October 18th, 1919, without a hitch of any kind. The process involved the erection of a derrick over 100 ft. high, constructed of planks. The pole rests with its base on the very summit of the mound, which is some 15 to 20 ft. above the natural level of the surrounding area, and thus not one inch of its splendid stature is lost. The old flagstaff had its base sunk in a ventilated brick chamber 12 ft. deep. The new one rides on a square block of steel 7 ins. in diameter, fitted into a notch at the base.

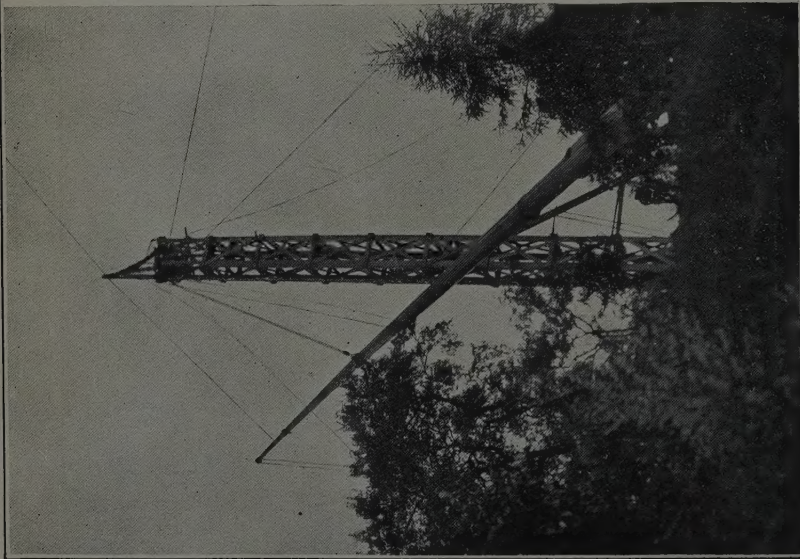
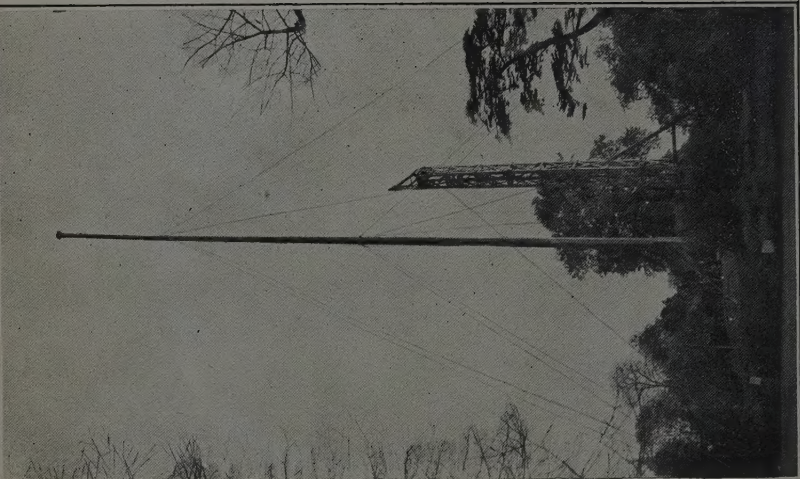
It was a matter of regret that Mr. J. H. Turner, owing to whose initiative the flagstaff was presented, was not able to be at Kew on the day of its erection.

Some acknowledgment is due from the Garden staff to the Contractors for the avoidance of any but a small amount of damage to the surrounding vegetation during this big operation. Except for the cutting down of a few of the botanical collection of lime trees at the behest of the Canadian officers, afterwards proved to be unnecessary, the injury to trees and shrubs in the neighbourhood has been practically *nil*.

The mound on which the flagstaff now stands (artificial, like all the small eminences and declivities of Kew) was the site of the







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Temple of Minden, or Temple of Victory, erected to commemorate the notable British triumph at Minden on August 1st, 1759. Thus, in a sense, history is repeated, for the popular fancy is to regard the erection of the pole as a witness of the triumph of our Imperial arms over a foe greater and more sinister than that of 1759. It is pleasing to think of it as such, although the inception of the enterprise dated from before the war. But, standing there as it does, towering far above and making pygmies of our native trees, we also accept it as a magnificent "exhibit" for Kew, a testimony to the generosity and Imperial spirit of the Premier and Government of British Columbia, and an example of the marvellous tree-growths that make the forests of that fine Province some of the richest and most wonderful on the face of the globe. May its days be long!

#### EXPLANATION OF PLATES XII. AND XIII.

Plate XII.—The upper photograph shows the flagstaff on the inclined trackway leading to the mound. The flagstaff is seen resting on rollers. Note also the notch cut at the base for the steel block.

The lower photograph shows the position of the flagstaff on the afternoon of October 17th. The steel block bolted firmly in position and the base of the staff resting on a small carriage with rollers below. We are enabled to reproduce this photograph by the courtesy of London News Agency Photos Ltd.

Plate XIII.—Fig. 1.—The position of the flagstaff on the morning of October 18th, with the derrick.

Fig. 2.—The flagstaff erect on the afternoon of October 18th.

## XXIX.—THE BOTANICAL SURVEY OF THE UNION OF SOUTH AFRICA.

It is with pleasure and interest that we are able to record the appointment by the Government of the Union of South Africa of an Advisory Committee to carry out and supervise a Botanical Survey of the territories included in the Union. This important enterprise, due largely to the initiative of Dr. I. B. Pole-Evans, Chief of the Division of Botany in the Department of Agriculture, Pretoria, has been under consideration for some time past and assumed practical and definite form when the Committee alluded to was appointed in the autumn, 1918.

Writing to the Director of Kew in June of this year, Dr. Pole-Evans, who is acting as Director of the Survey, made the welcome announcement that "the work of the Survey is proceeding smoothly and satisfactorily. Several of the workers have already made some progress and I feel success is assured."

The enlightenment of outlook in matters connected with the bearing of scientific knowledge on practical affairs, which experience has taught us to expect on the part of the Government of the Union of South Africa, has led to the ancillary decision explained in the subjoined communications:—

Extract from letter from Director of the Botanical Survey of the Union of South Africa, to Director, Royal Botanic Gardens, Kew, dated Division of Botany, Department of Agriculture, South Africa, 26th November, 1918.

*Botanical Survey of the Union of South Africa.*

*Appointment of Botanical Assistant at Kew.*

With reference to your letter of the 23rd of April last on the above subject and for which I am greatly indebted to you, I beg to inform you that I am now authorised by the Hon. the Minister for Agriculture to inform you that he has approved of provision being made on the Estimates of this Division for the forthcoming financial year for the salary of a Botanical Assistant at Kew in terms of your letter.

It is of course understood that the officer appointed will devote his or her whole time at Kew to work connected with the Botanical Survey of the Union and with this Division and such as the Director of Kew may think fit.

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Extract from letter from Director of the Botanical Survey of the Union of South Africa, to Director, Royal Botanic Gardens, Kew, dated Division of Botany, Department of Agriculture, South Africa, 28th April, 1919.

*Botanical Assistant at Kew.*

Our Estimates for the year ending March, 1920, have just been passed and I have written for the necessary authority to Cape Town, where the Minister is at present, to proceed with the appointment of the Botanical Assistant at Kew in terms of your letters of the 22nd of January last and April 23rd, 1918, and by the next mail I hope to be able to write definitely on the subject.

On September 15th, 1919, a letter from the High Commissioner for the Union of South Africa, in confirmation of the letters from Dr. Pole-Evans, announced that the post of Botanical Assistant for the Union of South Africa at Kew had been duly authorised and requested the assistance and advice of the Director of Kew in the selection of a suitable incumbent for the post.

The Director was able on September 19th to inform the High Commissioner that he was fortunately in a position to put forward the name of a citizen of the Union of South Africa for favourable consideration.

On October 15th Kew was informed by the High Commissioner that he had offered the post to Miss A. G. Corbishley, a graduate of the University of South Africa, and that she had accepted the appointment.

Miss Corbishley, who is a B.A. of the University of South Africa, received her botanical training under Professor J. W. Bews at Natal University College, Pietermaritzburg.



The Advisory Committee for the Botanical Survey of the Union, consists of the following persons, and the appointment was announced in the Union of South Africa Government Gazette of October 5th, 1918:—

Dr. I. B. Pole-Evans, M.A., D.Sc., F.L.S., Chief, Division of Plant Pathology and Botany, who will also act as Director of the Survey.

Prof. J. W. Bews, M.A., D.Sc., Natal University College.

Mrs. L. Bolus, B.A., South African College, Capetown.

Prof. R. Marloth, M.A., Ph.D., Capetown.

Prof. G. Potts, M.Sc., Ph.D., Grey University College, Bloemfontein.

Prof. S. Schonland, M.A., Ph.D., F.L.S., Rhodes University College, Grahamstown.

C. E. Legat, Esq., B.Sc., Chief Conservator of Forests.

E. R. Montgomery, Esq., M.R.C.V.S., Director of Veterinary Research.

At a meeting of botanists of the Department, held at the Botanical Laboratories, Pretoria; on February 18th, 1918, it was stated that the aims and scope of the Survey are:—

1. To continue and extend the Survey and systematic work already carried out by the Division of Botany on the Vegetation of the country.

2. To continue and extend the survey work already carried out by the Division of Veterinary Research on the relation of such vegetation to the unsolved stock diseases of South Africa.

3. To continue and extend the collections of the plant parasites of the indigenous vegetation already made by the Division of Botany, and proceed with its examination as a possible reservoir of diseases of cultivated plants and of domesticated animals, and in particular map their distribution.

4. To continue and extend the work already accomplished by the Forest Department in further ascertaining the composition of the indigenous forests, the value of their products and their industrial possibilities.

5. To study the vegetation from an industrial point of view.

6. To study the vegetation in its relation to agricultural and pastoral developments.

7. To study the plant succession under natural and artificial conditions.

8. To study the vegetation of the veld in connection with its feeding value and carrying capacity and to distinguish botanically between "sour" and "sweet" velds, good and bad pastures.

9. To study the disturbing influence of burning, manuring, cultivation, drainage, irrigation, overstocking, insect and plant pests on the natural vegetation.

10. To study plant distribution according to geological, orographical and climatological conditions and the conditions which influence the different plant formations.

11. To extend their knowledge of the medicinal and poisonous plants of the country.

12. To study the influence of South African conditions on the structure and physiology of the plants of the country and in particular the causes which give rise to non-parasitic diseases.

13. To compare and correlate our flora and its associated animal and plant diseases with those existing in other parts of the world under somewhat similar telluric and climatic conditions.

14. To devote more attention to the soil and its micro-organisms.

The meeting unanimously agreed that the best means of carrying out such a survey and of securing proper organisation, co-ordination and co-operation between Government Departments concerned and voluntary workers are:—

I. That the Survey should fall under the direction of the Chief Botanist of the Union, assisted by a small Advisory Committee, consisting of not more than five members and of representatives of Government Departments interested.

II. That the country should be split up into a convenient number of botanical areas, each of which should be controlled by a botanist for that region, and who should be responsible to the Director, voluntary workers in each area being responsible to the botanist in charge.

III. That the Survey should be carried out by Government Officers as well as by voluntary workers, provided they are not put to any pecuniary loss, and that rail warrants for travelling and expenses in connection therewith be furnished and paid by the Director of the Survey from funds provided for the purpose.

IV. That the seat of the Central Herbarium with all its necessary types and records should be established at Headquarters under the direct supervision of the Director of the Survey, and that regional Herbaria should be kept in the different botanical areas under the Botanist in Charge.

V. That provision be made for the necessary qualified assistants at the Central Herbarium to deal with the plants and records submitted from the regional herbaria.

VI. That the necessary arrangements be made with the Director at Kew—where for some years a Botanical Survey of the Empire has been in progress—whereby the services of a qualified assistant could be wholly devoted to the critical examination of plants submitted.

VII. That the objects and furtherance of the Survey can be obtained only by the preparation and publication of regional floras, local floras, check-lists and all other subject matter of interest.

VIII. That these should be issued when considered advisable as Government publications under the direction of the Director of the Survey as “Memoirs of the Botanical Survey of South Africa.”

IX. That the existing University Colleges and Museums should be made use of for the study of the Morphological,



Histological and Physiological problems connected with the peculiar conditions observed in South African vegetation.

Ever since Dr. Pole-Evans took charge of the Division of Botany in South Africa in 1913, the necessity of a Botanical Survey of the Union has been urged, and though the estimates did not make provision whereby the scheme could fully materialise, it is notable that during the past few years this Division, in co-operation with the Division of Veterinary Research, the Department of Forestry and private sympathisers, has made considerable progress, both by actual survey work and by the accumulation of a large amount of herbarium material, which includes the valuable collection presented by Mr. E. E. Galpin. F.L.S., to whom, with other collectors of past decades, botanists of the present and future owe a debt of gratitude. Thus were set the foundations of the Botanical Survey of the Union, now authorised by the Minister of Agriculture, and the display of such systematic use of every opportunity during a period which was naturally adverse to the elaboration of fresh schemes, augurs well for the future of the movement.

### XXX.—DECADES KEWENSES

PLANTARUM NOVARUM IN HERBARIO HORTI REGII  
CONSERVATARUM.

#### DECAS XCIV.

931. *Calathodes oxycarpa*, *Sprague* [Ranunculaceae]; a *C. palmata*, Hook. f. et Thoms., folliculis paucioribus sursum angustatis nec truncatis, stylis longioribus, appendicibus dorsalibus minoribus, antheris brevioribus, foliorum segmentis haud acuminatis, serraturis brevioribus recedit.

*Herba* 2-3.5 dm. alta. *Folia caulina* 3-4, 5-7 cm. diametro; petioli 4-10 cm. longi; vaginae infimae 1-1.5 cm. longae, ceterae multo breviores; laminae segmenta 3, lateralia usque 5-7 mm. a basi bipartita, terminalia circumscriptione rhomboidea, lobis obtusis breviter apiculato-serratis. *Flores* solitarii, vel caule semel cymose ramoso duo; pedunculi sub anthesi circiter 3.5 cm. longi, sub fructu 6.5-8.5 cm. longi. *Sepala* 5, alba, caeruleo-tincta (*Wilson*), obovato-elliptica, 1 cm. longa, 4.5-6.5 mm. lata, 5-nervia nervis 3 interioribus quam exterioribus magis conspicuis. *Filamenta* 2.5-4.5 mm. longa; antherae oblongae, 1.5 mm. longae. *Carpella* circiter 12, toro inferne 1.5 mm. ventraliter adnata, subfalcata, stylis inclusis circiter 5 mm. longa, extra papillata, dorso prope basin gibbosa; styli recurvi, vix 1.5 mm. longi, ventraliter stigmatosi; ovula biseriata, 9. *Folliculi* 6-10, verticillati, a latere visi cymbiformes, 8 mm. longi, 4.5 mm. lati, appendice dorsali suprabasali 1.5-1.75 mm. longo in axin decurrente; styli 1.75 mm. longi. *Calathodes palmata*, Oliv. in Hook. Ic. Pl. t. 1935, quoad plantam fructiferam, non Hook. f. et Thoms.

CHINA. Hupeh, Henry 6977 (fruiting specimen only). Szechuan: Mt. Wa, 2850 m. Wilson 3036.

*Farges* 924 from the Tchen-kéou-tin district of Eastern Szechuan is apparently a starved form of *C. oxycarpa*.

932. ***Osbeckia travancorica***, *Bedd.* MS. in Herb. Mus. Brit., ex Gamble [*Melastomaceae*-*Osbeckieae*]; *O. Wightianae*, Benth., affinis, ramulis longe-strigosis et foliis lanceolatis sensim acuminatis longis differt.

*Suffrutex* erectus, ramulis griseis setis longis reflexis basi bulbosae conspicue ornatis. *Folia* lanceolata vel elliptico-lanceolata, apice sensim acuminata, basi attenuata, 7-14 cm. longa, 2-4 cm. lata, basi tricostata, additis nervorum intramarginalium 1-2 paribus gracilibus, nervis et nervulis transversis multis subparallelis, utroque pagina setis hispidis longis ornata; petiolus circiter 5 mm. longus. *Flores* in paniculas terminales parce ramosas dispositi; bracteae et bracteolae orbiculares, margine setoso-ciliatae, persistentes. *Calycis* tubus urceolatus, fasciculis setosis pedicellatis albidis ornatus; lobi 5, ovati, apice obtusi vel emarginati, margine et dorso ciliati, apice setarum longarum fasciculo praediti, intra lobos appendices pedicellati setoso-fasciculati. *Petala* 5, purpurea, obovata, ciliata, 1-1.5 cm. longa. *Antherae* 7 mm. longae, filamentis aequales. *Ovarium* apice dense setosum, stylo subulato. *Capsula* urceolata, glauca, setosa, 7 mm. longa. *Semina* multa, angulata.

SOUTH INDIA. Travancore: in the hills at low elevations; foot of Peermede Ghat and between Cottayam and Mundakaim, Oct. 1880. *Beddome* 2976, 2878 (Herb. Mus. Brit.); at Mundakaim, *Wight*, K.D. 1100 (Herb. Kew.); *Beddome* 2977 (Herb. Mus. Brit.).

933. ***Oldenlandia Bourdillonii***, *Gamble* [*Rubiaceae*-*Hedyotideae*]; *O. stylosae*, O. Kze., plus minus affinis sed pubescens, foliis membranaceis lanceolatis angustis, stipulis multidentatis differt.

*Suffrutex* vix 1.25 m. altus, ramulis pubescentibus griseis. *Folia* membranacea, lanceolata, apice acuminata, basi attenuata, pubescentia, circiter 4 cm. longa, 1-1.5 cm. lata, nervis primariis obliquis utrinque circiter 3-4; petiolus brevis, pubescens, 3 mm. longus; stipulae elongatae pinnatisectae, dentibus circiter 9-11 maxime villosis approximatis. *Flores* in cymam corymbosam terminalem aggregati, bracteis linearibus, bracteolis minutis. *Calycis* tubus elongatus, villosus, lobis lanceolatis. *Corolla* extus pubescens. *Capsula* adhuc ignota.

SOUTH INDIA. Travancore: in scrub forest; 610-1200 m., August 1887, *T. F. Bourdillon* 111.

934. ***Oldenlandia eualata***, *Gamble* [*Rubiaceae*-*Hedyotideae*]; *O. swertioidi*, O. Kze., affinis, foliis longis petiolatis, viridibus nec luteis, membranaceis, cymarum paniculis patentibus differt.

*Suffrutex* erectus, debilis, ramulis subtetragonis viridibus glabris. *Folia* membranacea, oblongo-lanceolata, apice acuminata, basi attenuata, glabra, 10-17 cm. longa, 3-5 cm. lata, nervis utrinque circiter 8-10 pallidis curvatis; petiolus ad 1.2 cm.



longus, basi dilatatus, aliquando nullus; stipulae pinnatisectae, primum paullo pubescentes, demum glabrae, dentibus paucis circiter 3-7 gracilibus apice glandulosis munitae. *Flores* in paniculam cymarum terminalem longiusculam aggregati; pedicelli graciles; bracteae et bracteolae lineares, satis conspicuae. *Calycis* tubus glaber; lobi lanceolati, 2-3 mm. longi. *Corollae* tubus elongatus gracilis. *Capsula* depresso-globosa, circiter 2 mm. longa. *Hedyotis eualata*, Bedd. M.S. in Herb. Kew.

SOUTH INDIA. Hills of South Tinnevely, 1200-1500 m., *Beddome* 25; Pykara Falls in Nilgiris, 1500 m., *M. A. Lawson* (1884).

935. **Oldenlandia Ramarowii**, *Gamble* [Rubiaceae-Hedyotideae]; *O. membranaceae*, *O. Kze.*, affinis, foliis conspicue nervosis scabride puberulis et floribus pedicellatis differt. *O. Thwaitesii*, *O. Kze.* etiam, ramulis foliis et cymis sessilibus affinis sed stipulis maxime discrepans, et floribus pedicellatis.

*Suffrutescens*, ramulis tetragonis crassis pallidis puberulis. *Folia* elliptica vel lanceolata, apice acuta, basi attenuata et petioli alas formantia, utraque pagina scabride puberula, subtus pallida, 8-11 cm. longa, 2-3 cm. lata, nervis primariis obliquis parallelis utrinque 7-10; petiolus 6-12 mm. longus, alatus; stipulae triangulares, pectinatae, dentibus circiter 7 curvatis puberulis. *Flores* in cymas sessiles axillares fasciculati; pedicelli graciles, 3 mm. longi; bracteae lineares, longae. *Calycis* tubus infundibuliformis, brevis, albide villosus; lobi lineari-lanceolati, 2 mm. longi. *Corollae* tubus cylindricus; lobi oblongo-lanceolati, fauce villosi. *Stamina* vix exserta. *Capsula* subglobosa, glabra.

SOUTH INDIA. Travancore: Ponnudi; Feb. 1914, *M. Rama Row* 2373.

936. **Oldenlandia villosostipulata**, *Gamble* [Rubiaceae-Hedyotideae]; species distincta, siccitate flavescent, cymis axillaribus, pedicellis gracilibus, praecipue stipulis ovatis pectinatis conspicue multifidis villosissimis insignis.

*Frutex* circiter 1-1.5 m. altus, ramulis tetragonis glabris. *Folia* elliptica vel ovata, apice obtuse acuta, basi attenuata et petioli alas formantia, glabra, 3-6 cm. longa, 2-2.5 cm. lata, nervis primariis obliquis circiter 5; petiolus 3-10 mm. longus, alatus; stipulae ovatae, breves, pectinatae, fimbriis numerosis linearibus villosissimis ornatae. *Flores* in cymas axillares sessiles vel fasciculos dispositi; pedicelli graciles, 5-6 mm. longi. *Calycis* tubus brevissimus glaber; lobi lanceolati, ciliati, 3 mm. longi; tubus et lobi raphidibus conspicuis ornati. *Corollae* tubus campanulatus 5 mm. longus; lobi erecti, lanceolati, 3 mm. longi, extus glabri, intus villosi. *Stamina* paullo exserta; antherae oblongae, tenues. *Capsula* ovoidea, glabra, 2-3 mm. longa. *Semina* monuta, triquetra; testa reticulata.

SOUTH INDIA. Travancore: Mutthukulivayal; October, 1894. *T. F. Bourdillon* 338.

937. **Oldenlandia wynaadensis**, *Gamble* [Rubiaceae-Hedyotideae]; *O. sisaparensi* (*Hedyotis sisaparensis*, *Gage*) affinis, foliis minoribus, stipulis triangularibus pectinatis villosis, cymis brevioribus secundis differt.

*Frutex* erectus insignis, ramulis albescentibus nodosis. *Folia* vix petiolata, membranacea, lanceolata, acuminata, supra pallide viridia, subtus glauca sed basin versus caerulescentia, 5-6 cm. longa, 1-1.5 cm. lata, nervis primariis utrinque circiter 4; stipulae triangulares, pectinatim longe villosodentatae. *Flores* in cymes breves paniculatas axillares glabras, 5 cm. longas dispositi; pedicelli breves; bracteae et bracteolae longae, lineares. *Calycis* tubus infundibuliformis, 2 mm. longus, glaber; lobi lineari-lanceolati, 2 mm. longi, graciles; tubus et lobi raphidibus conspicuis ornati. *Corollae* tubus cylindricus, 3-4 mm. longus; lobi patentes, lanceolati, intus villosi. *Stamina* exserta. *Capsula* depresso-globosa, glabra. 2-3 mm. longa.

SOUTH INDIA. Wynaad: in Chambrá peak forests; 1350-1800 m., *Beddome*.

938. **Ophiorrhiza Barberi**, *Gamble* [Rubiaceae-Hedyotideae]; *O. Brunonis*, W. & A., affinis, bracteolis perbrevibus, cymis laxifloris gracilibus et capsulis minoribus vix 5 mm. latis differt.

*Suffrutex* erectus, ramulis teretibus glabris. *Folia* lanceolata vel elliptico-lanceolata, apice caudato-acuminata, basi attenuata, 7-14 cm. longa, 2-5 cm. lata, glabra, subtus pallida, nervis utrinque 7-9 curvatis et arcuatim junctis prominulis; petiolus gracilis, 1-2 cm. longus; stipulae perbreves, pulvinatae, glandulosae. *Cymae* axillares, laxae, scorpioideae, glabrae; pedunculus communis gracilis, 2-4 cm. longus; pedicelli graciles, fere filiformes; bracteolae minutae circiter 1 mm. longae. *Calycis* tubus brevis, complanato-campanulatus, glaber; lobi brevissimi, subulati. *Corollae* tubus cylindricus, superne ampliatus, 5-7 mm. longus, intus setarum annulo conspicue ornatus; lobi ovati, patentes. *Stamina* 5, in tubo corollae inclusa, sessilia, antheris linearibus. *Ovarium* complanatum, glabrum; stylus gracilis; stigmata 2, rotundata. *Capsula* emarginata, 2 mm. longa, ad 5 mm. lata.

SOUTH INDIA. Anamalai Hills: Paralai; Oct. 1901, *Barber* 3793; Travancore Hills: Mañkulam, about 1000 m. alt., May 1915, *K. Venkoba Rao* 3143.

939. **Ophiorrhiza codyensis**, *Gamble* [Rubiaceae-Hedyotideae]; *O. pectinatae*, Arn., affinis stipulis latis ovatis diu persistentibus, cymis patentibus et foliis subtus glaucescentibus differt.

*Suffrutex* erectus, ramulis teretibus minute puberulis. *Folia* lanceolata, apice longe acuminata, basi in petiolum attenuata, siccitate membranacea, 8-16 cm. longa, 3-4 cm. lata, nervis utrinque 8-12 prominulis marginem versus curvatis et ibi arcuatim junctis; petiolus saepe 4 cm. longus, sed plus minus laminae basi decurrenti marginatus; stipulae conspicuae ovatae diu persistentes ad 1 cm. longae et 7 mm. latae, nervis multis parallelibus e basi ortis. *Cymae* axillares, patentes, ad 2 cm. latae, fructiferae latiores; bracteolae sessiles lanceolatae vel lineari-lanceolatae acuminatae circiter 7 mm. longae, glabrae, pedicelli brevissimi. *Calycis* dentes minuti triangulares. *Corollae* tubus cylindricus, glaber, 6-7 mm. longus, intus villosus. *Capsulae*



glabrae, 1-2 mm. longae, circiter 5 mm. latae, cystolithis conspicuis notatae.

SOUTH INDIA. Sampagi Ghat: Coorg; Oct. 1913, *Sir A. and Lady Bourne*, 6197.

940. *Ophiorrhiza pykarensis*, *Gamble* [Rubiaceae-Hedyotideae]; species distincta foliis parvis, cymis paucifloris, bracteolis minutis insignis.

*Suffrutex* basi lignosus, 25-30 cm. altus, ramulis teretibus nodosis. *Folia* lanceolata, apice acuta, basi cuneata, decurrentia, subtus pallida et ad nervos pubescentia, supra glabra, 2-4 cm. longa, ad 1 cm. lata, nervis utrinque 7-8 curvatis, supra prominentibus; petiolus gracilis, .5-1 cm. longus; stipulae minimae, triangulares, acuminatae, cito deciduae et glandulis multis ornatae. *Cymae* terminales, pauciflorae, puberulae; pedunculus communis 1-1.5 cm. longus; pedicelli 0.5-1 cm. longi; bracteolae minutae, lineari-lanceolatae. *Calycis* tubus brevis, complanato-campanulatus, pubescens; lobi brevissimi, ovati. *Corollae* tubus infundibularis, circiter 1 cm. longus, villosus, caerulescens; lobi ovati, patentes. *Stamina* 5 in tubo corollae inclusa, filamentis brevibus, antheris linearibus obtusis. *Discus* prominens, crassus, ovari apicem cingens; ovula permulta, placentis e basi divaricatis; stylus simplex parce hirsutus; stigmata 2 recurva. *Fructus* nondum repertus.

SOUTH INDIA. Nilgiri Hills: Pykara Falls; about 2000 m. alt., May 1889, *Gamble* 20506.

## XXXI.—A REVISION OF THE GENUS MENDONCIA.

W. B. TURRILL.

The genus *Mendoncia* was founded by Vellozo in *Vandelli, Florae Lusitanicae et Brasiliensis Specimen*, p. 43 (1788). An excellent generic description is given but no specific combination is made. Flowers and fruits are figured at tab. iii. fig. 22 of this work but the name *Mendocia* is used on the plate. According to Wittstein, *Etym.-bot. Handwörterbuch*, the genus was named after Cardinal Mendonça, Patriarch of Lisbon. The name was altered to *Mendozia* by Ruiz and Pavon in their "*Florae Peruv. et Chil. Prodrum*," p. 89 (1794), and specifically indeterminate flowers and fruits are again figured (tab. xvii.). The first species, namely *Mendozia aspera* and *Mendozia racemosa*, were described by Ruiz and Pavon in "*Syst. Veget. Flor. Peruv. et Chil.*" p. 158 (1798). Both were transferred by Nees in *DC. Prod.* to *Mendoncia* but one of them, *M. racemosa*, is a very doubtful species, possibly belonging to an entirely different genus. The other publications in which a number of species are described under the generic name *Mendozia* are Martius, *Nov. Gen. et Spec. Pl. Brasil.*, iii. (1829), Poeppig et Endlich., *Nov. Gen. et Spec. Plant.*, iii. (1845), and Martius, *Flora Brasiliensis*, ix. (1847).

Prior to the publication of the *Acanthaceae* in De Candolle's

Prodromus the only specific combinations with the generic name *Mendoncia* were *M. albida* and *M. coccinea*, both published by Vellozo in *Florae Fluminensis*, p. 263 (1825). Nees in DC. *Prodromus*, xi. p. 50 (1847), monographed the species at that time known, and used the correct name *Mendoncia*. Since then a number of isolated species have been described in various publications, chiefly by Lindau.

In Bentham and Hooker, *Genera Plantarum*, ii. p. 1072, *Mendoncia* is placed with *Thunbergia* in the tribe *Thunbergieae*. Lindau in Engler and Prantl, *Pflanzenfamilien*, iv. iii. B. p. 289, creates the subfamily *Mendoncioideae* for the reception of the genera *Mendoncia*, *Monochlamys* and *Afromendoncia* while *Thunbergia* is placed in the subfamily *Thunbergioideae* together with the genera *Pseudocalyx* and *Meyenia*. The following is a key to these allied genera:—

Fructus drupaceus, retinaculis nullis.

Ovarium primo biloculare.

Flores 1-4 in foliorum axillis; antherarum thecae longitudinaliter dehiscentes ... *Mendoncia*.

Flores in racemis; antherarum thecae dehiscentia porosa ... *Monochlamys*.

Ovarium semper uniloculare ... *Afromendoncia*.

Fructus capsularis, retinaculis papillosis.

Pollinis granula sphaeroidea, sulcata.

Antherarum thecae longitudinaliter dehiscentes *Thunbergia*.

Antherarum thecae dehiscentia porosa... *Pseudocalyx*.

Pollinis granula rotata, marginibus dentatis ... *Meyenia*.

*Engelia* (Karst. ex Nees in DC. *Prod.* xi. p. 721), is said to differ from *Mendoncia* in having the tube of the corolla provided with an anticous spur at about the middle, and the 5-partite limb split in front. This genus is reduced to *Mendoncia* in the *Genera Plantarum* and Lindau follows this in the *Pflanzenfamilien*. It seems probable that a mistake was made in the original diagnosis but it has not been possible to identify the two species described as *E. Tovarensis*, Kl. & Karst., and *E. villosa*, Kl. & Karst.

In the following revision of the genus a Latin description of each species is given. This has been considered advisable because many of the original descriptions are too imperfect for a species to be identified from them alone. Fortunately the Kew Herbarium possesses a large number of types or co-types and these have been used as bases for most of the descriptions here given.

The geography has been carefully revised by Mr. T. A. Sprague, to whom the writer tenders his thanks.

**Mendoncia**, Vell. in Vand. Fl. Lusit. et Bras. Specimen, p. 43, tab. 3, fig. 22 (1788).

*Bracteolae* 2, in spathae formam conspirantes, corollae tubum ad medium vel totum includentes, saepe ad margines agglutinatoconnatae tunc demum plus minusve solutae, planiusculae vel carinatae. *Calyx* brevis, annularis vel cupularis, integer, saepissime membranceus, glaber vel pubescens. *Corolla* tubulosa, tubo-

recto vel incurvo cylindraceo vel superne ampliato basem versus saepe gibboso vel obliquo, limbo parvo vel magno lobis 5 reflexis vel patentibus. *Stamina* 4, e tubo parte media enata, didynama, posticis parum longioribus et robustioribus, inclusa, filamentis brevibus, antheris linearibus glabris vel dorso glanduloso-puberulis, thecis parallelis basi subaequalibus vel valde inaequalibus barbulatis, pollinis granulatis globosis. *Discus* annularis, carnosus, valde convexus, basem ovarii includens. *Ovarium* plerumque oblique lenticulari-compressum, primo inaequaliter biloculari, demum loculo minore abortiente uniloculare ovulis in loculis 1-2, stylo filiformi sursum curvato-adscendente. stigmate breviter inaequaliter bilobo terminato, lobo antico saepe majore. *Fructus* drupaceus, ovoideo-compressus, apice saepissime obliquus, mesocarpio carnosus vel pulposus, endocarpio osseo; semina 1-2, retinaculis nullis, erecta, basi lateraliter affixa, cotyledonibus plicatis corrugatis vel convolutis, radícula brevi. *Fructices* vel suffructices volubiles, pilis simplicibus vel e basi stellata orientibus instructi, caulibus inferne obsolete quadrangularibus superne teretibus vel subteretibus. *Folia* opposita, integerrima, petiolata, penninerva. *Flores* purpurei, coccinei, vel pallidi, pedicellati, pedicellis in foliorum axillis solitariis vel binis vel ternis rarissime quaternis. Nees in DC. Prodr. xi. p. 50. *Mendozia*, Ruiz & Pavon, Florae Peruv. et Chil. Prod., p. 89 (1794). *Engelia*, Karst. ex Nees in DC. Prod. xi. p. 721.

Corolla 5·5-7·5 cm. longa.

Corolla infundibuliformis; ovarium dense pubescens.

Folia usque ad 1·5 dm. longa et 1 dm. lata, haud dense pubescentia; corolla 7·5

cm. longa ... .. 1. *speciosa*.

Folia usque ad 9 cm. longa et 4·3 cm. lata, dense flavido-pubescentia; corolla 5·5

cm. longa ... .. 2. *mollis*.

Corollae tubus cylindricus.

Ovarium minute papillosum vel puberulum.

Folia 9-13 cm. longa, 5-7 cm. lata; bracteolae oblongae, apice sub-oblique acuminatae, 4-4·5 cm. longae, 1·5 cm. latae ... .. 3. *gigas*.

Folia usque ad 9 cm. longa et 5 cm. lata; bracteolae oblongae, vel oblongo-ovatae, apice in acumen 5 mm. longum abrupte contractae, ad 3·5 cm. longae, 1·5 cm. latae ... .. 4. *Spraguei*.

Ovarium glabrum ... .. 5. *squamuligera*.

Corolla vix 5 cm. longa vel saepissime multo minor.

Bracteolae hirsutae, puberulae vel villosae.

Bracteolae fere 4 cm. longae vel longiores.

Bracteolae oblanceolato-oblongae ... .. 6. *Tonduzii*.



- Bracteolae lineari - vel lanceolato-oblongae.
- Bracteolae pedicellique patule villosae.
- Bracteolae apice in mucronem 6 mm. longum gradatim acuminatae ... 7. *pilosa*.
- Bracteolae apice acutae, mucrone 2-3 mm. longo instructae ... 8. *Lindavii*.
- Bracteolae pedicellique adpresse strigoso-hirsutae... 9. *Hoffmannseggiana*.
- Bracteolae 3 cm. longae vel saepissime breviores.
- Folia integerrima.
- Bracteolae pedicellique pilis adpresse tecta.
- Flores in foliorum axillis solitarii vel binis vel rarius ternis.
- Bracteolae oblongo-vel lanceolato-ovatae.
- Bracteolae apice obtusae, breviter mucronatae... 10. *coccinea*.
- Bracteolae apicem versus gradatim angustatae, mucronato-acuminatae.
- Bracteolae dense adpresse hirsutae ... 11. *aspera*.
- Bracteolae sparse adpresse hirsutae.
- Fructus 2 cm. longus, 1.1 cm. diametro ... 12. *Sprucei*.
- Fructus 1.4 cm. longus, 8 mm. diametro ... 13. *gracilis*.
- Bracteolae ellipticae ... 14. *costaricana*.
- Flores in foliorum axillis 4-10 ... 15. *multiflora*.
- Bracteolae pedicellique pilis patentibus instructae.
- Bracteolae ovatae vel late ovatae, haud longe hirsutae ... 16. *albida*.
- Bracteolae oblongae vel oblongo-ellipticae, pilis longis hirsutae.
- Bracteolae oblongo - ellipticae; pedicelli circiter 2 cm. longae; corolla infundibuliformis ... 17. *puberula*.
- Bracteolae oblongae; pedicelli circiter 3 cm. longi; corolla cylindrica ... 18. *hirsuta*.
- Folia margine late planeque crenata ... 19. *crenata*.
- Bracteolae glabrae vel fere glabrae.
- Bracteolae 1-1.6 cm. longae.
- Flores in foliorum axillis 1-2.
- Pedicelli circiter 2.5 cm. longi ... 20. *glabra*.
- Pedicelli 1-1.5 cm. longi ... 21. *Schwackeana*.
- Flores in foliorum axillis 4-9 ... 22. *orbicularis*.

Bracteolae 2·5-3 cm. longae.

Bracteolae apice retusae ... 23. *retusa*.

Bracteolae apice rotundatae.

Bracteolae oblongae ... 24. *tarapotana*.

Bracteolae oblongo-obovatae ... 25. *obovata*.

1. **Mendoncia speciosa**, Nees in DC. Prodr. xi. p. 54 (1847).

*Planta* volubilis, caulibus quadrangularibus vel subquadrangularibus hirsutis. *Folia* elliptica vel late elliptica, apice cuspidato-acuminata, basi rotundata vel abrupte leviterque decurrentia, petiolo excluso usque ad 1·5 dm. longa et 1 dm. lata, pagina inferiore sparse hirsuta, superiore pilis e basi stellata orientibus instructa, costa et nervis lateralibus utrinque, infra praecipue, prominentibus, nervis tertiariis subparallelis; petiolus 3·5-6·5 cm. longus, sparse hirsutus. *Flores* solitarii, magni; bracteolae oblongo-obovatae, apice breviter cuspidatae, 3·7 cm. longae, 1·8 cm. latae, marginibus fere ad apicem agglutinatae, extra sparse hirsutae, intus glabrae; pedicelli 2·5-4 cm. longi, sparse hirsuti. *Calyx* cupularis, membranaceus, 2·5 mm. longus. *Corolla* 7·5 cm. longa, 4 cm. diametro, extra glabra, alba, fauce violacea (ex Schlim). *Discus* annularis, carnosus, 1 mm. longus, puberulus. *Ovarium* compresso-cylindricum, leviter obliquum, 4 mm. altum, 1·5 mm. diametro, dense puberulum; stylus 3 cm. longus, inferne leviter puberulus, superne glaber. *Fructus* oblique obovoideus, lenticulari-compressus, 2·7 cm. altus, 1·2 cm. diametro, glaber.

COLOMBIA. Dept. Magdalena: Santa Marta; Valle-dupar, Atanques, fl. and fr. Aug., Purdie; Santa Marta, 1370 m., fl. May, H. H. Smith 1137 (distributed by mistake as *Mendoncia spectabilis*, Nees ab E.). Dept. Santander; environs of Ocaña, 1220 m. fl. July, L. Schlim 19.

The specimen collected by Schlim is somewhat more hirsute than the type.

2. **Mendoncia mollis**, Lindau in Engl. Bot. Jahrb. 25, Beibl. 1x. p. 44. (1898).

*Frutex* volubilis, caulibus subquadrangularibus patentihirsutis, internodiis circiter 12 cm. longis. *Folia* ovata vel elliptico-ovata, apice sensim acuminata et subito mucronulata, basi rotundata, usque ad 9 cm. longa et 4·3 cm. lata, supra dense pubescentia, infra densissime molliterque flavido-pubescentia, nervis lateralibus utrinque 3, cum costa pagina utraque prominentibus, petiolo 1 cm. longo densissime flavido-pubescente. *Flores* albidii vel flavo-albi (ex Glaziov), in foliorum axillis solitarii; pedicelli 2-2·5 cm. longi, patenter et dense flavido-pubescentes; bracteolae obovatae, apice truncato-rotundatae, mucrone 1·5 mm. longo instructae, basi rotundatae vel obtusae, 3 cm. longae, 2 cm. latae, usque ad apicem marginibus agglutinatae, extra dense flavido-pubescentes, intus leviter pubescentes. *Calyx* annularis, 2 cm. altus, pubescens. *Corolla* infundibuliformis, 5·5 cm. longa, fauce 1·2 cm. diametro. *Discus* glaber, vix 1 mm. longus. *Ovarium* oblique ovoideo-compressum,

3 mm. altum, 4 mm. diametro; dense pubescens. *Fructus* obovoideus, lenticulari-compressus, apice rotundatus vel obtusus, circiter 2 cm. longus et 1.2 cm. latus. Glaziou in Bull. Soc. Bot. France lviii. Mem. 3, 530. *M. puberula*, Glaziou, l.c.

BRAZIL. Minas Geraes: Serra do Caraca; in woods near Alegria, fl. June-July, Glaziou 16292; fr. Dec.-Jan., Glaziou 15289.

3. *Mendoncia gigas*, Lindau in Notizbl. Bot. Gart. Berlin, vi., p. 192, 1914.

*Planta* scandens, caule tereti pilis adpressis instructo aspero. *Folia* elliptica, apice acuminata, basi rotundata, 9-13 cm. longa, 5-7 cm. lata, supra scabra, ad costas hirsuta, subtus omnino flavo-pubescentia; petiolus 2-3 cm. longus, adpresso-hirsutus. *Flores* 2-4 in foliorum axillis; pedicelli 3-3.5 cm. longi, tomentosi; bracteolae oblongae, apice suboblique acuminatae, 4-4.5 cm. longae, 1-5 cm. latae, margine agglutinatae, extra tomentosae, intus glabrae. *Calyx* truncatus, lobulatus, 1-1.5 mm. longus, puberulus. *Corolla* purpurea, glabra, tubo 5.5 cm. longo basi 8 mm. supra basin 3.5 mm. apice 10 mm. diametro, lobis 5 rotundatis 6-7 mm. diametro. *Stamina* 4, 2 altius inserta, filamentis inferioribus 4 mm. longis, superioribus 5 mm. longis, antheris sagittiformibus thecis exterioribus longioribus 1.8 vel 1.5 cm. longis basi pilosis, interioribus basi glabris 16 vel 13 mm. longis, ad rimas pilis glanduligeris minimis obsitis; pollinis granula globosa, typica, 50-54  $\mu$  diametro. *Discus* 1.5 mm. altus. *Ovarium* 3 mm. altum, puberulum; stylus 4.5 cm. longus, glaber, stigmate bilobo. *Fructus* 2 cm. longus, 8 mm. latus, 7 mm. crassus, apice oblique acuminatus, puberulus.

BRAZIL. Amazonas: Rio Acre; near Seringal Auristella, fl. and fr. April, E. Ule 9800 ex Lindau l.c.

#### 4. *Mendoncia Spraguei*, Turrill, sp. nov.

*Suffrutex* volubilis, caulibus subteretibus, patule fulvo-hirsutis internodiis usque ad 13 cm. longis. *Folia* elliptico-ovata, apice acuminata, basi rotundata vel leviter acuta, usque ad 9 cm. longa et 5 cm. lata, nervis lateralibus utrinque circiter 4 pagina utraque prominentibus marginem versus sursum curvatis, inferiore hirsuta, superiore pilis distinctis e basi stellata orientibus tecta; petiolus 1.5-2 cm. longus, patule fulvo-hirsutus. *Flores* saepissime 3 in foliorum axillis: bracteolae oblongae vel oblongo-ovatae, apice in acumen 5 mm. longum abrupte contractae, basi rotundatae, usque ad 3.5 cm. longae et 1.5 cm. latae, costa media prominente, nervis lateralibus obscuris, extra fulvo-hirsutae, intus glabrae, marginibus fere ad apices agglutinatis; pedicelli 1.5-2.5 cm. longi, patule fulvo-hirsuti. *Calyx* annularis, 2 mm. longus, glaber. *Corolla* usque ad 6 cm. longa, cylindrica, tubo plus minusve curvato basi 5 mm. diametro, medio 2.5 mm. diametro, fauce 7 mm. diametro, glabra, limbo quinquelobato subbilabiato. *Stamina* 4; filamenta brevissima; antherae dorso glandulosae, duo anticae 9 mm. longae, apice hamatae, basi lobis barbatis leviter inaequalibus, duo posticae 1 cm. longae, apice complanatae, basi lobis barbatis inaequalibus; pollinis granula 56  $\mu$  diametro. *Discus* carnosus, 1 mm. altus, glaber. *Ovarium* lenticulari-ovoideum, 3 mm. altum, 2 mm. diametro, minute



papillosum; stylus usque ad 4.5 cm. longus, apice brevissime inaequaliter bifidus, parte infima papillosa excepta glaber.

COLOMBIA. Caquetá Territory: Mocoa, T. A. Sprague, 402.

5. **Mendoncia squamuligera**, Nees in DC. Prodr. xi., p. 50 (1847).

*Suffrutex* scandens, caulibus adpresse hirsutis vel glabris subteretibus. *Folia* late elliptica apice rotundata breviter cuspidata, basi acuta vel rotundata vel cuneata, usque ad 12 cm. longa et 8 cm. lata, costa nervisque pagina utraque prominentibus, nervis lateralibus marginem versus sursum curvatis, utrinque 3-4, inferiore plus minusve fulvo-hirsuta, superiore fere glabra vel pilis e basi stellata orientibus instructa; petioli circiter 2 cm. longi, fulvo-hirsuti vel glabri. *Flores* 2-3 in foliorum axillis; bracteolae oblongae 4.1 cm. longae, 1.3 cm. latae, apice apiculatae, basi rotundatae, extra fulvo-hirsutae ciliataeque, intra glabra; pedicelli 1.7-7 cm. longi, graciles dense fulvo-hirsuti. *Corolla* usque ad 6.5 cm. longa, cylindrica. *Calyx* brevissimus, glaber. *Ovarium* oblique lenticulari-oblongum, 0.5 cm. altum, 2.5 mm. diametro, glabrum; stylus 4.5 cm. longus, glaber, apice sub-inaequaliter bifidus. *Fructus* oblongo-obovatus, lenticulari-compressus, apice acute apiculatus, 1.8 cm. longus, 8 mm. diametro, glaber vel fere glaber.

FRENCH GUIANA. Cayenne, Martin; Acarouany, Sagot 1045; Poiteau.

The specimen collected by Poiteau has leaves with very cuneate bases. That this character is of little value is shown by Rudge's plants in Herb. Mus. Brit., for these have on the same stem leaves with rounded bases and leaves with cuneate bases.

6. **Mendoncia Tonduzii**, Turrill, sp. nov.

*Suffrutex* volubilis, caulibus tetragonis fulvo-hirsutis. *Folia* late elliptica, apice acuminata, basi usque ad 11.5 cm. longa et 6 cm. lata, costa nervis lateralibusque pagina inferiore prominentibus, superiore subprominentibus, nervis lateralibus utrinque 4-5 marginem versus sursum curvatis, tertiariis subparallelis, supra pilis e basi stellata orientibus oblecta, infra nervis praecipue dense fulvo-hirsuta et minutissime puberula; petiolus 2.5 cm. longus, dense fulvo-hirsutus. *Bracteolae* oblongo-oblancoelatae, nervo medio conspicuo praeditae, subcarinatae, apice truncatae, apiculatae, extra dense fulvo-hirsutae, intus glabrae; pedicellus usque ad 3.5 cm. longus, dense fulvo-hirsutus. *Calyx* annularis, 1 mm. longus, extra leviter hirsutus. *Corolla* alba (Tonduz). *Antherae* apice acuminatae, 8 mm. longae, posticae thecis inaequalibus, basi breviter barbato-puberulis exceptis glabrae; pollinis granulae circiter 48  $\mu$  diametro. *Discus* carnosulus, annularis, 1 mm. altus, glaber. *Ovarium* oblongo-ovatum, lenticulari-compressum, 3 mm. altum, basi 2 mm. latum, minutissime puberulum; stylus basi minutissime puberula excepta glaber, apice breviter inaequaliter bifidus.

COSTA RICA. Tucurrique, A. Tonduz 12946.

NICARAGUA. Chontales Mts., Seemann.

7. **Mendoncia pilosa**, Nees in DC. Prod. xi. p. 50.

*Frutex* adscendens, 6-8 pedum altitudinem attingit, ramis rectis vel volubilibus teretiusculis hirtis. *Folia* late ovata, apice in cuspidem sat longum acutum attenuata, basi rotundata, 7-13 cm. longa, 5-9 cm. lata, hirsuta. *Flores* 1-4, in axillis foliorum positi; pedicelli filiformes, erecti 2.5-7.5 cm. longi; bracteolae lineari-lanceolatae, deorsum falcatae, planae, basi rotundatae, fere 4 cm. longae, 1.25 cm. latae, nervo medio valde prominulo in mucronem 6 mm. gradatim excurrente, pilis longis fulvis hirtae. *Calyx* annularis, glaber. *Corolla* fere 4 cm. longa, glabra, coccinea, tubo anguste tubuloso, superne nonnihil dilatato, limbo brevi. *Stamina* 4, filamentis perbrevis compressis, antheris acutis fere 2.5 cm. longis, posticarum thecis basi conspicue inaequalibus; staminis quinti rudimentum minimum subuliforme, vix 2 mm. longum, inter stamina duo postica. *Ovarium* compresso-ovatum, pubescens; stylus filiformis, glaber, superne nonnihil dilatatus; stigmatis lobi subaequales. *Fructus* compresso-oblongus. *Mendoncia pilosa*, Mart., Nov. Gen. et Spec. iii. p. 21, tab. 209 (1829); Poepp. et Endl. Nov. Gen. et Spec. iii. p. 11 (1845); Nees in Mart. Flor. Bras. ix., p. 11 (1847). *Mendoncia granulosa*, Nees in DC. Prod. xi. p. 51 (1847).

BRAZIL. Amazonas: In primeval forest along the river Japurá; near Manacuru, *Martius* (l.c.); Rio Negro, near Porto dos Mirauhas, *Martius* (l.c.); near Ega, *Poeppig* (ex Poepp. et Endl. l.c.).

8. **Mendoncia Lindavii**, Rusby, in Mem. Torrey Bot. Club, iv. p. 241 (1895).

*Frutex* volubilis, ramis vetustis sparse adpresseque hirsutis quadrangularibus, junioribus dense fulvo-hirsutis. *Folia* elliptica vel ovato-elliptica, apice acuminata, basi rotundata vel acuta, 5-18 cm. longa, 3-8 cm. lata, inferne hirsuta, superne pilis numerosis e basi stellata orientibus instructa, nervis lateralibus utrinque 4-5, costa nervisque pagina superiore subprominentibus, inferiore prominentibus, nervis tertiariis subparallelis; petiolus circiter 1 cm. longus, dense fulvo-hirsutus. *Flores* 1-3 in foliorum axillis; bracteolae lanceolato- vel lineari-oblongae leviter curvatae, apice acutae, mucrone 2-3 mm. longo instructae, 3-5 cm. longae, 8-9 mm. latae, extra dense patuleque fulvo-villosae, intus glabrae, uninerves; pedicelli usque ad 6 cm. longi, saepissime breviores, dense patuleque fulvo-villosi. *Calyx* cupularis, 1.5 mm. longus, glaber vel plus minusve pubescens. *Corolla* anguste infundibuliformis, 4.5 cm. longa, rubra (ex Rusby) vel intense coccinea (ex André) glabra, tubo 1.5 cm. supra basem constricto unilateraliter ventricosus, fauce 6 cm. diametro, lobis subaequalibus inferiore paulum longiore ovato-orbicularibus 4-5 mm. longis latisque. *Antherae* fere sessiles, in corollae tubo prope medium insertae, apice acuminatae thecis basi barbulatis, posticae 1.7 cm. longae thecis basi leviter inaequalibus, anticae 1.3 cm. longae thecis basi valde inaequalibus; pollinis granula 40  $\mu$  diametro. *Discus* annularis, carnosus, 1 mm. longus. *Ovarium* ellipsoideum, lenticulari-compressum, 3 mm. longum, 2 mm. diametro, densissime pilosum; stylus

4.3 cm. longus, glaber, apice leviter dilatatus, breviter bifidus. *Fructus* oblongo-obovatus, inaequilateralis, lenticulari-compressus, 2 cm. altus, 1 cm. latus, minute sed dense pubescens.

GUATEMALA. Dept. Alta Verapaz: Cubilquitz; 350 m. *H. von Tuerckheim* 7939.

COLOMBIA. Dept. Cauca: Armada (between Barbacoas and Tuquerres), 1040 m., fl. May, *Ed. André* 3468; Dept. Antioquia; Frontino, 1200–1800 m., fl. and fr. Sept., *Lehmann* 7238; llanos of San Martin, 400 m., *J. Triana* 4030; llanos of San Martin, near Villavicencio, *Dawe* 229.

BOLIVIA. Dept. Cochabamba: Yungas, *A. Miguel Bang* 532; Dept. La Paz; Tipuani-Guanai, fl. Dec., *A. Miguel Bang* 1707; Mapiri, 1520 m., fl. May, *H. H. Rusby* 2405; near Inglis-Inglis, fr. Aug., *R. S. Williams* 1494; Moro, 1520–1824 m., fl. Jan. *R. Pearce*.

9. **Mendoncia Hoffmannseggiana**, Nees in DC. Prod. xi. p. 50 (1847).

*Suffrutex* volubilis, caulibus subquadrangularibus tortis adpresse pubescentibus, internodiis usque ad 15 cm. longis, nodis tumidis. *Folia* elliptica vel argutissime elliptico-obovata, acuminata vel argutissime cuspidata, basi acuta, usque ad 13 cm. longa et 6 cm. lata, costa nervis lateralibusque pagina superiore subprominentibus, inferiore prominentibus, nervis lateralibus utrinque 5–6 marginem versus sursum curvatis, teriariis subparallelis, supra pilis asperis e basi stellata orientibus obecta, infra dense adpresse hirsuta vel glabrescentia; petioli 1.5–3 cm. longi, plus minusve adpresse hirsuti. *Pedicelli* 1–2 nis in foliorum axillis, 4–7 cm. longi, dense adpresse strigoso-hirsuti; bracteolae lineari-oblongae, subfalcatae, breviter mucronulatae, 3–3.8 cm. longae, 1 cm. latae, extra dense adpresse strigoso-hirsutae, intus glabrae. *Calyx* annularis, vix 1 mm. longus. *Corolla* tubulosa, 4.5–5 cm. longa, glabra, limbo brevi. *Stamina* 4; antherae posticae praecipue dorso glandulosae, thecis basi breviter barbatis; posticae 1.1 cm. longae, thecis basi valde inaequalibus; anticae 1.4 cm. longae, thecis basi inaequalibus; pollinis granula circiter 40  $\mu$  diametro; filamenta 2 mm. longa. *Ovarium* oblique obovatum, lenticulari-compressum, 3 mm. altum, 2.5 mm. diametro, puberulum; stylus gracilis, apice breviter bifidus, 4 cm. longus, inferne patente puberulus, superne glaber. *Fructus* oblique obovatus, lenticulari-compressus, 1.7 cm. longus, 0.8 cm. diametro, pubescens. *Mendozia Hoffmannseggiana*, Nees in Mart, Fl. Bras. ix. p. 9 (1847). *Mendoncia Schomburgkiana*, Nees in DC. Prodr. xi. p. 50 (1847). *Mendozia pubescens*, Hoffmannsegg ex Nees l.c. p. 50 (1847).

BRITISH GUIANA. *Parker*; Massaroonie, *Appun* 275; *Schomburgk* 783 (1431); Demerara, *R. Jenman* 6541.

FRENCH GUIANA. *Poiteau*; Karouany, *P. Sagot* 21; Acarouany, *P. Sagot* 21.

VENEZUELA. Lower Orinoco: Manoa, *H. H. Rusby* and *R. W. Squires*, 146.

BRAZIL. Amazonas: Manaos, *Ule* 5221; Trinidad (introduced), *Crueger* 254.



10. **Mendoncia coccinea**, Vell. Fl. Flum., p. 263 (1825); vi. tab. 86.

*Frutēx* vel suffrutēx volubilis 6–10 pedes altus, totus pilis adpressis fulvo-hirsutis instructus, caulibus subquadrangularibus. *Folia* elliptica, ovata, vel oblonga, apice acuminata, basi rotundata vel subacuta, usque ad 1·4 dm. longa et 6 cm. lata, pagina superiore pilis e basi stellata orientibus tecta, inferiore dense fulvo-hirsutis praecipue in nervis, nervis lateralibus utrinque 5 pagina utraque prominentibus, tertiariis subparallelis; petiolus 0·5–2 cm. longus, adpresse hirsutus. *Flores* in foliorum axillis, solitarii, bini, rarius terni; pedicelli 2·5 usque ad 7 cm. longi, sursum leviter incrassati, dense pilis fulvis obtecti; bracteolae lanceolato-ovatae, apice obtusae, breviter cuspidatae, 2·5–3 cm. longae, circiter 1 cm. latae, marginibus fere ad apicem agglutinoso-connatae, costa prominente, extra dense fulvo-hirsutae, intus glabrae. *Calyx* annularis, brevissimus, glaber. *Corolla* 3·5–3·8 cm. longa, rubra, glabra, tubo cylindrico circiter 1 cm. supra basem constricto superne leviter ventricosso fere stricto, lobis suborbicularibus inter se subaequalibus. *Antherae* fere sessiles, acutae; posticae 1·2 cm. longae, thecis basi vix inaequalibus minute barbulatis anticae 9 mm. longae, thecis basi valde inaequalibus; pollinis granula 40  $\mu$  diametro. *Discus* annuliformis, carnosus, 1 cm. longus, glaber. *Ovarium* ellipsoideo-compressum, leviter obliquum, 2·5 mm. altum, 2 mm. diametro, dense minutissime glandulosum; stylus 2·7 cm. longus, glaber, apice breviter bifidus. *Fructus* oblongo-lenticularis, apice leviter obliquus, 1·5 cm. altus, 7 mm. diametro, glaber vel leviter puberulus. *Mendozia Velloziana*, Mart. Nov. Gen. et Spec. iii. p. 22 tab. 210 (1829); Poepp. et Endl. Nov. Gen. et Spec. iii. p. 10 (1845); Nees in Mart. Fl. Bras., vol. ix. p. 11, 1847. *Mendozia Velloziana*, Mart. var. *sphingeria*, Mart. l.c. *Mendozia lancifolia*, Presl. Sym. Bot. p. 30. t. 80 (1832). *Mendoncia Velloziana*, Nees in DC. Prod. xi. p. 52 (1847); Miquel Stirp. surinam. select., p. 127 (1850). *Mendoncia Velloziana*, Nees, var. *sphingeria*, Nees in DC. Prod. xi. p. 52 (1847).

BRAZIL. Bahia: Ilheos, *Blanchet*; Rio Janeiro, *Tweedie*; *Lhotsky* (ex *Presl.*); fl. and fr. Sept., *Bowie* and *Cunningham*; Corcovado Mts., *Miers* 3190; Corcovado Mts., by way of Laranjeiros, fl. Dec., *Burchell*; Valley of Laranjeiros, fl. June., *Burchell* 2973; Organ Mts., *Miers* 4008; *Sello* (without exact locality); Moro do Telegrapho, near Rio Janeiro, 134 (Mart. Herb. Brasil. p. 104, 1837); Santa Catherina, *Tweedie*.

var. **sparatteria**, *Turrill*, comb. nov. A planta typica bracteolis majoribus usque ad 3 cm. longis et 1·7 cm. latis basi truncatis differt. *Mendoncia Velloziana*, Nees, var. *sparatteria*, Nees, in DC. Prod. xi. p. 52 (1847). *Mendozia Velloziana*, Mart., var. *sparatteria*, Mart. Nov. Gen. et Spec. iii. p. 23. *Mendoncia fulva*, Lindau in Bull. Herb. Boiss. v. 646 (1897).

BRAZIL. Amazonas: Rio Uaupès; Panurè, *Spruce* 2683. Minas Geraes; near Tapinha Canga, *Gardner* 5128; Lagoa Santa, fl. Nov., *Warning*. Rio de Janeiro; *Gardner* 194; Corcovado, *Miers* 3125; between the Convent of Santa Theresa and the valley

of Larangeiros, Burchell 952; the middle part (about  $\frac{2}{3}$ ) of the ascent up the Serra de Cubataõ fl. Dec., *Burchell* 3643.

var. **elliptica**, *Turrill*, var. nov. A planta typica bracteolis late ellipticis majoribus 3 cm. longis 2 cm. latis differt.

COLOMBIA. *J. Triana*.

11. **Mendoncia aspera**, *Nees* in DC. Prodr. xi. p. 51 (1847).

*Planta* herbacea (e *Spruce*), volubilis, caulibus subteretibus adpresse pubescentibus, nodis turgidis, internodiis usque ad 11 cm. longis saepissime brevioribus tortis. *Folia* late elliptica, apice acuminata, basi rotundata vel plus minusve inaequaliter acuta, costa nervis lateralibusque pagina superiore subprominentibus, inferiore prominentibus, nervis lateralibus utrinque 4-6, marginem versus sursum curvatis, tertiariis subparallelis, pagina utraque adpresse pubescentia vel interdum supra glabrescentia; petiolus 1-3 cm. longus, pubescens vel glabrescens. *Pedicelli* 1-3-ni in foliorum axillis, adpresse pubescentes; bracteolae lanceolato-ovatae, apicem versus gradatim angustatae, mucronato-acuminatae, circiter 2.2 cm. longae et 0.8 cm. latae, dense sericeo-hirsutae vel adpresse pubescentes, intus glabrae. *Calyx* annularis, 0.5 mm. longus. *Corolla* tubulosa, 3.4 cm. longa, extra glabra, intus glabra, tubi parte contracta leviter glandulosa excepta tubo basi dilatato leviter contracto deinde gradatim ampliatio et superne cylindrico, limbo brevi 5-lobato. *Stamina* 4; antherae posticae 0.9 cm. longae thecis basi inaequalibus, anticae 1.1 cm. longae thecis basi fere aequalibus breviter barbatis exceptis glabrae; pollinis granula circiter 35  $\mu$  diametro. *Ovarium* lenticulari-compressum, ambitu oblongo-ovatum, puberulum; stylus glaber, apice fere aequaliter bifidus. *Fructus* oblongo-obovatus vel oblongus, lenticulari-compressus, fere niger (ex *Spruce*), carnosus, 1.6 cm. longus, 9 mm. latus, sparsissime puberulus. De Vriese in Nederl. Kruidk-Arch. 1. (1848), p. 353. Pulle, Vasc. Pl. Surinam, p. 431. *Mendozia aspera*, Ruiz et Pav. Syst. Veg. p. 158 (1798); *Nees* in Mart. Fl. Bras. ix. p. 9 (1847).

DUTCH GUIANA. *Miquel*; *Hostmann* 44; Paramaribo, *Splitgerber* (ex *De Vriese*); Paramaribo, near Poelepantje, *Kegel* 55 (ex *Pulle*).

VENEZUELA. Rio Casiquiare: In secondary woods, *Spruce* 3284.

PERU. Prov. Ayacucho: Woods about Monterico, 900-1200 m., *R. Pearce*; *Matthews* 1232.

var. **rotundifolia**, *Nees* in DC. Prodr. xi. p. 51 (1847). A planta typica foliis brevioribus magisque rotundatis differt. *Mendozia rotundifolia*, Poepp. et Endl., Nov. Gen. et Spec. iii. p. 10 (1845).

BRAZIL. Amazonas: In primeval woods, *Ega*, *Poeppig*, in Herb. DC., 2194 (ex *Nees*); Bahia, *Blanchet*, in Herb. DC., 1474 (ex *Nees*).

12. **Mendoncia Sprucei**, *Lindau* in Bull. Herb. Boiss. v. p. 647 (1897).

*Suffrutex* scandens, caulibus longitudinaliter sulcatis tortis,

junioribus sparse pilosis, senioribus fere glabris, internodiis 10-13 cm. longis. *Folia* elliptico-ovata vel elliptico-obovata, apice acuminata, basi acuta vel subrotundata, usque ad 8 cm. longa et 4.7 cm. lata, costa et nervis lateralibus pagina utraque prominentibus, nervis lateralibus utrinque 6-8, ad marginem anastomosantibus, pagina superiore sparsissime pilosa inferiore sparse sed ad nervos saepe densius adpresse pilosa; petiolus 1-1.5 cm. longus, sparse adpresse hirsutus tenuis. *Flores* in foliorum axillis solitarii; pedicelli 5-7 cm. longi, adpresse pilosi, tenues; bracteolae oblongo-ovatae, 2.2 cm. longae, 1.1 cm. latae, apice sensim mucronato-acuminatae, basi rotundatae, extra sparse adpresse hirsutae, intra glabrae, usque ad apice fere margine agglutinatae. *Calyx* annularis, brevis, glaber. *Corolla* glabra. *Antherae* glandulosae; pollinis granula 32-48  $\mu$  diametro. *Ovarium* glabrum; stylus apice breviter bifidus, glaber. *Fructus* obovatus, 2 cm. longus, 1.1 cm. diametro, glaber, nigro-purpureus (ex Spruce).

BRAZIL. Amazonas: Rio Negro; near Sao Gabriel da Cachoeira, Spruce 2332.

This species is very closely related to *Mendoncia aspera*, Nees, and may be only a variety of it.

### 13. *Mendoncia gracilis*, Turrill, sp. nov.

*Frutex* volubilis, caulibus gracilibus subquadrangularibus hirsutis. *Folia* elliptica vel oblongo-elliptica, apice argutissime attenuato-acuminata, basi angustata, usque ad 8.3 cm. longa et 4 cm. lata, nervis lateralibus utrinque circiter 4 marginem versus sursum curvatis cum costa pagina utraque prominentibus, supra pilis e basi stellata orientibus instructa infra pilis e basi dilatata orientibus praedita vel nervis hirsutis exceptis glabrescentia; petiolus 1.5 cm. longus, hirsutus. *Flores* 1-2 in foliorum axillis; pedicelli usque ad 4 cm. longi, adpresse hirsuti; bracteolae oblongo-ellipticae, apice obtusae vel rotundatae, apiculatae, basi rotundatae, 1.5 cm. longae, 1 cm. latae, extra haud dense hirsutae, intus glabrae. *Calyx* brevissimus, annularis, glaber. *Corolla* 2.5 cm. longa, extra glabra, tubo basi 2.6 mm. diametro, fauce 4-6 mm. diametro. *Stamina* fere sessilia, antherae circiter 7 mm. longae, thecis basi inaequalibus; pollinis granula 38  $\mu$  diametro. *Discus* cupularis, carnosus, 1 mm. altus, glaber. *Ovarium* ellipsoideo-ovoideum, lenticulari-compressum, 2 mm. altum, basi 2 mm. diametro, glabrum; stylus 1.6 cm. longus, glaber. *Fructus* ellipsoideo-obovoideus, leviter compressus, apice apiculatus, 1.4 cm. longus, 8 mm. diametro, glaber.

COLOMBIA. Dept. Cundinamarca: Rio Negro; Mesa Grande, 1200-1300 m., Lehmann 8792.

An unlocalized and unnumbered specimen collected in Colombia by J. Triana is probably this species, though the bracteoles are somewhat larger. Neither flowers nor fruits are present.

### 14. *Mendoncia costaricana*, Örst. in Vidensk. Meddel., 1854, p. 113.

*Suffrutex* volubilis, ramis subtetragonis adpresse hirsutis demum plus minusve glabratis. *Folia* petiolata, elliptica, apice



acuminata, basi acutiuscula, 7·5–9·5 cm. longa, 3 4·6 cm. lata, margine leviter revoluta, pagina superiore obscure viridia pilis minutis e basi subtilissime stellata orientibus adspersa, inferiore fusciscentia, strigilloso-pubescentia, nervis lateralibus utrinque 3–4; petioli adpresse hirsuti, 1–2·5 cm. longi. *Pedicelli* fructiferi axillares, 1–5-nis, circiter 1·5 cm. longi, adpresse hirsuti; bracteolae ellipticae, concavae, mucronatae, 1·6 cm. longae, 0·7–1·0 cm. latae, hirsutae. *Calyx* annuliformis, brevissimus, truncatus. *Drupa* oblique obovata, lenticulari-compressa, mucronata, 1·4 cm. longa, 8–9 mm. lata, glabra.

COSTA RICA. Aguacate and Cartago, *Örsted*.

PANAMA. Lion Hill Station; Aug. 1861, *S. Hayes* 368.

The author adds the following note to his description: "Affinis *Engeliae villosae*, Kl. et Karst. (DC. Prod. xi. p. 721), a qua differt foliorum indumento, ramis costalibus paucioribus, petiolis brevioribus, bracteis brevioribus et apice latioribus. Corollae in specimenibus meis desunt."

15. ***Mendoncia multiflora***, Nees in DC. Prod. xi. p. 52 (1847).

*Caulis* fruticosi, altissime scandentes, ramis volubilibus longissimis simplicibus teretiusculis superne obtusangulis pilosis dein glabrescentibus. *Folia* elliptica, acutissime acuminata, basi attenuata, 9 cm. longa, 5 cm. lata, supra glabra obscure viridia, subtus adpresse hirta, strigosa, mollia, subferruginea; petioli supra profunde canaliculati, hirti. *Pedicelli* axillares, crebri, 4 ad 10, basi connexi, interdum subcymosi, uniflori, obtusanguli, petiolo breviores; bracteolae ovaes vel subrotundatae, mucrone incurvo rigido terminatae, coriaceae, ad medium usque connatae, uti pedicellus pilis sericeis adpressis nitidis badii densissime vestitae. *Calyx* minutus. *Corolla* anguste tubulosa, violacea, glabra. *Drupa* ovato-oblonga, compressa, acuta, glabra. *Mendoza multiflora*, Poepp. et Endl. Nov. Gen. et Spec. iii., p. 10, tab. 208, fig. 1–3 (1845); Nees in Mart. Fl. Bras., vol. ix. p. 12 (1847). *Mendoncia strigosa*, Poepp. ex Nees in DC. Prod., xi. p. 52 (1847).

BRAZIL. Amazonas; In primeval woods near Ega, *Poeppig*.

There is some discrepancy between the description and figure given by Poeppig and Endlicher, and it is possible that the plant is very closely related to *M. puberula*, Nees, or is even a variety of that species.

*Mendoncia tomentosa*, Poepp. ex Nees in DC. Prod. xi. p. 52, *Mendoza tomentosa*, Poepp. ex Nees in Mart. Fl. Bras. ix. p. 12 (1847), is probably a variety or a luxuriant state of *M. multiflora*, Nees. It is described as having a grey-tomentose indumentum, suborbicular leaves and subrotund bracteoles. The type specimen (*Poeppig* 2818, in Herb. Acad. Petrop.) is said to be very incomplete.

16. ***Mendoncia albida***, Vell. in Flor. Flumin. p. 263 (1825); vi. tab. 85 (1827).

*Frutex* volubilis, caulibus quadrangularibus vel subquadrangularibus hirsutis vel fere glabris. *Folia* elliptico-lanceolata

vel elliptico-ovata, apice argutissime acuminata, basi acuta vel subrotundata, usque ad 9.5 cm. longa, 2.4-5 cm. lata, costa nervis lateralibusque utrinque prominentibus, nervis lateralibus utrinque circiter 5 marginem versus sursum curvatis, pagina superiore pilis saepe e basi dilatata orientibus plus minusve oblecta, inferiore hirsuta; petiolus saepissime brevis, 0.5-2 cm. longus, hirsutus. *Flores* in foliorum axillis 1-2; pedicelli 1.5-3 cm. longi, hirsuti; bracteolae ovatae vel late ovatae apice acutae, mucrone 1-2 mm. longo instructae, basi rotundatae, usque ad 2.5 cm. longae et 1.5 cm. latae, extra plus minusve hirsutae, intus glabrae. *Calyx* cupularis, 2 mm. longus, glaber. *Corolla* infundibuliformis, tubo 2.6 cm. longo, basi 2.6 mm. diametro, 6 mm. supra basem 2 mm. diametro, faucē 8 mm. diametro, extra glabra, lobis 5 inaequalibus. *Stamina* 4, glandulosa, filamentis brevissimis, antheris 6 mm. longis, thecis basi inaequalibus; pollinis granula circiter 35  $\mu$  diametro. *Discus* cupularis, vix 2 mm. altus, carnosus, glaber. *Ovarium* oblique obovoideum, lenticulari-compressum, 2.5 mm. longum, 2.5 mm. diametro, minutissime dense puberulum; stylus 1.8 cm. longus, superne leviter crassatus, glaber.

BRITISH GUIANA. *Schomburgk* 439.

BRAZIL. Pará: Rio Trombetas, *Spruce*; Prainha, fl. Dec., *J. W. Traill* 641; Bahia, *Blanchet* 3107; Minas Geraes; Lagoa Santa, *Warming*.

17. *Mendoncia puberula*, *Nees* in DC. Prod. xi., p. 53 (1847), pro parte majore.

*Suffrutes* volubilis, caulibus tetragonis tortis internodiis usque ad 1.5 cm. longis instructis, junioribus deusissime hirsutis, senioribus plus minusve hirsutis vel glabratis, ad nodos incrassatis ibique densius hirsutis ramosis, ramis caulibus similibus saepe valde extenuatis, ita ut apex in longum cirrhum abeat. *Folia* elliptico-ovata, elliptica vel oblongo-elliptica apice acuminata, basi plus minusve rotundata vel breviter attenuata usque ad 11.5 cm. longa et 8.5 cm. lata sed saepissime minor, costa nervis lateralibus pagina utraque prominentibus, nervis lateralibus utrinque 5-6, tertiariis plus minusve parallelis, infra nervis praecipue hirsuta supra hirsuta vel glabrescentia, pilis in pagina superiore interdum e basi stellato-dilatata subulatis; petioli 1.4-5 cm. longi, saepissime patenti-hirsuti. *Pedicelli* 1-2 in foliorum axillis, 1-3 cm. longi, plus minusve dense patenti-hirsuti; bracteolae oblongo-ellipticae, 1.5-2 cm. longae, 1-1.3 cm. latae, apice obtusae vel rotundatae, nervo dorsali in mucrone excurrente praeditae, extra dense patenti-hirsutae vel interdum hirtopubescentes, intus glabrae. *Calyx* annularis, brevissimus, vix 0.5 mm. longus, glaber. *Corolla* 2.2 usque ad 3.7 cm. longa, extra glabra, intus tubo in parte contracta antice glanduloso; tubus compresso-teres, ex ima basi 4 mm. diametro ampliatus deinde parum contractus, sursum gradatim ampliatus, antice plus minusve ventricosus; lobi 5, subaequales. *Stamina* 4; antherae 8 mm. longae, duae anticae oculis aequalibus, duae posticae thecis basi inaequalibus, thecis basi brevissime barbatis exceptis glabrae; filamenta in parte libera circiter 3 mm. longa, glabra;

pollinis granulis circiter 35  $\mu$  diametro. *Discus* annularis, carnosulus, 1 mm. altus, glaber. *Ovarium* lenticulari-compressum, ovatum, glabrum vel minute lepidotum; stylus glaber, apice breviter bifidus. *Fructus* lenticulari-compressus, ovatus, circiter 1.6 cm. longus et 1 cm. diametro, glaber. *Mendozia puberula*, Mart. Nov. Gen. et Spec. iii. p. 24, tab. 211 (1829); Nees in Mart. Fl. Bras. ix., p. 10 (1847). *Mendozia pubescens*, Poepp. et Endl. Nov. Gen. et Spec. iii. p. 11 (1845). *Mendoncia Sellowiana*, Nees in DC. Prod. xi. p. 53 (1847); Miquel, Stirp. Surinam. Select., p. 128 (1850). *Mendoncia Splitgerberiana*, De Vriese in Nederl. Kruidk. Arch. 1. (1848) p. 353. *Mendozia Sellowiana*, Nees in Mart. Fl. Bras. ix. p. 10 (1847); Pulle, Vasc. Pl. Surinam, p. 431 (1906).

GUIANA. Surinam, Paramaribo, near plant. Merveille, *Splitgerber* 546 (ex Pulle, l.c.), *Focke* 198 (ex Pulle, l.c.), Para district, near plant. la Rencontre, *Focke* 794 (ex Pulle, l.c.).

BRAZIL. Rio de Janeiro: Organ Mts.; about the head of the River Pacaque, *Burchell* 2080; at San Jose da Laranjerra, *Burchell* 9904; Organ Mts., *Gardner* 597; J. Miers 4009; Theresopolis, *Glaziou* 4020; (without exact locality, probably near Rio de Janeiro) *Sello*. Minas Geraes; frequent in small woods and on hedges at Lagoa Santa, fl. Dec.-Feb., *Warming*.

COLOMBIA. Dept. Santander: Salazar, *W. Kalbreyer* 830.

ECUADOR. Salango, *Hind*; without precise locality, *Sinclair*.

The specimens from Colombia and Ecuador are somewhat doubtfully placed in this species. The bracteoles and pedicels have much shorter hairs than in the typical plants from Brazil.

18. ***Mendoncia hirsuta***, Nees in DC. Prod. xi., p. 52 (1847).

*Frutex* voubilis, ramis quadrangularibus pilis fulvis patentibus fere 4 mm. longis rigidis instructis. *Folia* elliptico-oblonga, interdum inaequalia, apice in acumine 1.5 cm. longo gradatim angustata, basi angustata, usque ad 14.5 cm. longa et 4.8 cm. lata, saepissime minora, nervis lateralibus utrinque 4-5, costa nervisque pagina superiore subprominentibus, inferiore prominentibus, utraque fulvo-hirsutis; petiolus 1.5-3 cm. longus. *Flores* 1-2 (saepissime 2) in foliorum axillis; pedicelli 2-3.5 cm. longi, patente fulvo-hirsuti; bracteolae oblongo-ellipticae, apice subobtusae mucrone setiforme 2 mm. longo terminatae, basi rotundatae, 2.4-2.8 cm. longae, 1.5-1.6 cm. latae, acriter carinatae, venosissimae, intus glabrae, extra pilis fulvis usque ad 3 mm. longis instructae. *Calyx* cupularis, vix 1 mm. longus, glaber. *Corolla* pallide lilacina vel alba, 3 cm. longa. *Discus* 0.75 mm. longus, glaber. *Ovarium* lenticulari-compressum, ambitu oblique oblongum, glabrum; stylus 1.4 cm. longus, apicem versus pilis nigris patentibus instructus, alioqui glaber. *Fructus* compresso-cylindricus, apice oblique dilatatus, 1.6 cm. longus, 6 mm. diametro, glaber. *M. angustifolia*, Poepp. ex Nees in DC. Prod. xi. p. 52. *Mendozia hirsuta*, Poepp. et Endl. Nov. Gen. et Spec. iii. p. 10 (1847).

BRITISH GUIANA. Shore of the River Pomeroon, Sept. 1843, *R. Schomburgk*.

DUTCH GUIANA. *Miquel*.



FRENCH GUIANA. *Poiteau*.

COLOMBIA. Lower Magdalena river: Naranjo, fl. Dec. *Ed. André*.

BOLIVIA. Dept. La Paz: Tumupasa; 540 m., *R. S. Williams* 552; Coroico, *R. Pearce*.

PERU. Dept. Loreto: Maynas and Yurimaguas, *Poeppig* (ex *Nees* l.c.).

19. ***Mendoncia crenata***, *Lindau* in Bull. Herb. Boiss. v., p. 647 (1897).

*Planta* scandens, caulibus subteretibus subsulcatis pubescentibus, internodiis 10 cm. superantibus. *Folia* oblonga, apice longe acuminata, basi angustata, usque ad 15 cm. longa et 7 cm. lata, pagina superiore scabro-hirsuta, inferiore molliter pubescentia, margine late planeque crenata; petiolus circiter 2 cm. longus, supra canaliculatus, pubescens. *Flores* in axillis complures; pedicelli usque ad 4 cm. longi, pubescentes; bracteolae ovatae, basi rotundatae, apice acuminatae vel rarius rotundatae, circiter 2 cm. longae et 1.3 cm. latae, ad fructum parum majores dense molliter pubescentes, *Calyx* annularis, brevis. *Fructus* glaber, drupaceus, 1.5 cm. longus, 8 mm. latus, subcompressus, apice truncatus, antice acuminatus rudimento styli instructus, postice rotundatus.

FRENCH GUIANA. *Mélinon* (ex *Lindau*).

20. ***Mendoncia glabra***, *Nees* in DC. Prod. ix., p. 52 (1847).

*Planta* volubilis, caulibus subquadrangularibus glabris. *Folia* elliptico-ovata, acuminata, basi rotundata vel acuta, 5-8 cm. longa, 2.5-4 cm. lata, glabra vel fere glabra, nervis lateralibus utrinque circiter 4, pagina superiore subprominentibus, inferiore prominentibus, petiolo usque ad 3 cm. longo glabro. *Flores* in foliorum axillis geminati; bracteolae ovatae, acutae, vel leviter apiculatae 1.6 cm. longae, 1.4 cm. latae, glabrae; pedicelli circiter 2.5 cm. longi, glabri, *Calyx* annularis, brevissimus, glaber. *Corolla* (ex *Nees*) angusta, tubulosa, limbo lato. *Stamina* quatuor, filamentis 1 mm. longis, antheris apice acuminatis 7 mm. longis, thecis basi brevissime barbatis, antherarum posticorum thecis basi inaequalibus, anticorum fere aequalibus; pollinis granula 40  $\mu$  diametro. *Discus* annularis, carnosus, 1 mm. longus, glaber. *Ovarium* obovoideum, 2 mm. longum, 1.5 mm. diametro, glabrum; stylus glaber, apice bifidum. *Mendozia glabra*, *Poepp.* et *Endl.*, Nov. Gen. et Spec. 111., p. 10 (1845).

PERU. "Lima," *Ruiz & Pavon*; ad missionem Tocache, *Poeppig* (ex *Poepp.* et *Endl.* l.c.).

21. ***Mendoncia Schwackeana***, *Lindau* in Bull. Herb. Boiss. iii., p. 361 (1895).

*Planta* scandens, caulibus hirsutis, dein glabrescentibus. *Folia* ovata, apice acuminata acutiuscula, basi subrotundata, 6-10 cm. longa, 3-5 cm. lata, sparse pilosa, ad costas et ad marginem densius hispidula; petioli 10-13 mm. longi, hirsuti. *Flores* axillares, solitarii, albi, pedicellis 10-15 mm. longis hirsutis; bracteolae excavatae, 15 mm. longae, in medio 14 mm.

latae, sparse (magis in margine) pilosae. *Calyx* truncatus, irregulariter fissus, circiter 1 mm. longus. *Corollae* tubus 19 mm. longus, basi 4 mm. diametro, supra basim ad 3 mm. constrictus, apice 10 mm. diametro; lobi aequales 10 mm. longi, 9 mm. lati. *Filamenta* 4 mm. longa, postica altius affixa; antherarum thecae in eadem fere altitudine affixae, 7 mm. longae, basi barbatae, connectivo apice in dentem 2 mm. longum producto; pollinis granula typica, circiter  $46\ \mu$  diametro. *Discus* 1.5 mm. altus. *Ovarium*. 2.5 mm. altum; stylus 1.7 cm. longus; stigma inaequaliter bilobum.

BRAZIL. Minas Geraes; in thickets near Itacolumi, Schwacke 9029 (ex Lindau).

22. *Mendoncia orbicularis*, Turrill, sp. nov.

*Frutex* volubilis, ramosus, caulibus subteretibus leviter puberulis tunc demum glabrescentibus. *Folia* elliptico-ovata, apice acuminata, basi subrotundata vel breviter decurrentia, usque ad 11 cm. longa et 5.2 cm. lata, costa nervis lateralibusque pagina utraque subprominentibus, reticulatione impressa, nervis laterali-bus marginem versus sursum curvatis, supra glabra, infra nervis leviter puberula; petiolus 2-2.5 cm. longus, glaber vel fere glaber. *Flores* 4-9 in foliorum axillis; pedicellus 1.7 cm. longus, glaber; bracteolae orbiculares, suborbiculares, vel late ovatae, apice rotundatae vel acutae, apiculatae, basi subcordatae, 1.2 cm. longae, 1.1 cm. latae, extra leviter minutissime puberulae, intus glabrae, virides (ex Spruce). *Calyx* annularis brevissimus, glaber. *Corolla* alba (ex Spruce), tubo subcylindrico, superne vix ampliata, 1 cm. longo, circiter 5 mm. diametro, lobis 5 subaequalibus. *Stamina* 4, antheris 4 mm. longis apice apiculato-spathulatis thecis basi leviter inaequalibus. *Discus* annularis, carnosus, 1 mm. altus, glaber. *Ovarium* oblique ovoideum, vix 2 mm. altum et 2 mm. diametro, glabrum; stylus 9 mm. longus, apice leviter bifidus, glaber.

ECUADOR. At the foot of Mt. Chimborazo, 923 m., fl. July, Spruce 6213.

23. *Mendoncia retusa*, Turrill, sp. nov.

*Suffrutex* volubilis, ramis quadrangularibus, sparsissime hirsutis vel glabris. *Folia* ovato-elliptica vel elliptico-oblonga, acuminata, basi rotundata vel in petiolo plus minusve inaequaliter decurrentia, usque ad 10.5 cm. longa et 5.6 cm. lata, pagina utraque glabra vel sparsissime hirsuta, nervis lateralibus utrinque 4-6 cum costa supra subprominentibus, infra prominentibus, marginem versus anastomosantibus; petioli 2-4 cm. longi, sparsissime hirsuti. *Pedicelli* 2.5-3 cm. longi, glabri; bracteolae oblongae vel oblongo-obovatae, retuso-apiculatae, 2.8 cm. longae, extra fere glabrae vel sparsissime hirsutae, intra glabrae. *Calyx* annularis, 0.75 mm. longus, extra puberulus. *Discus* annularis, carnosus, 1 mm. altus. *Filamenta* 3 mm. longa; antherae 8 mm. longae, dorso glandulosae; pollinis granula 40-48  $\mu$  diametro. *Ovarium* minutissime puberulum; stylus glaber, apice breviter bifidus.

NICARAGUA. R. Tate 291 (435).

PANAMA. Mannee Station; Sect. 30, S. Hayes 169.

24. **Mendoncia tarapotana**, *Lindau*, in Bull. Herb. Boiss, Ser. ii., iv. p. 313 (1904).

*Planta* volubilis, glaberrima, caulibus acute quadrangulis vel subquadrangulis. *Folia* elliptica vel elliptico-ovata, apice acuminata, basi rotundata, petiolo 1-2 mm. incluso usque ad 12.5 cm. longa, saepissime breviora, 6-6.5 cm. lata, subcoriacea, nervis lateralibus utrinque 4-5, costa et nervis pagina utraque prominentibus, reticulatone impressa. *Flores* 1-2 in foliorum axillis positi; bracteolae oblongae, 2.5 cm. longae 1 cm. latae, apice rotundatae in mucronem brevem productae, basi rotundatae, marginibus plus minusve agglutinato-connatae; pedicellus circiter 2 cm. longus, superne auctus. *Corolla* alba, fauce purpurea, infundibuliformis, 3.5 cm. longa, tubo apice 0.5 cm. diametro, glabra, intra in fauce glandulosa. *Stamina* 4; antherae thecis basi barbularis, fere sessiles, 2 posticae 1 cm. longae basi valde inaequales, 2 anticae 8 mm. longae basi vix inaequales; pollinis granula 48  $\mu$  diametro. *Discus* annularis, carnosus, 1 mm. altus. *Ovarium* ellipsoideum compressum 3 mm. altum, 2 mm. diametro, glabrum vel minutissime glandulosum; stylus 4 cm. longus, glaber, apice brevissime bifidus.

PERU. Dept. Loreto: near Tarapoto; in Mt. Guayrapurima, fl. Sept., *R. Spruce* 4620.

25. **Mendoncia obovata**, *Lindau* in Bull. Herb. Boiss. v. 646 (1897).

*Planta* volubilis, carnosula, caulibus tenuibus subteretibus tortis sparsissime adpresse hirsutis vel glabris, internodiis 9-16 cm. longis. *Folia* elliptica, apice acuminata, basi acuta, usque ad 18 cm. longa et 8 cm. lata, glabra, pagina utraque costa et nervis lateralibus prominentibus, nervis lateralibus utrinque 4-6 marginem versus sursum curvatis, nervis tertiariis plus minusve parallelis; petiolus usque ad 3 cm. longus, glaber, tenuis. *Flores* in foliorum axillis 1-2, coccinei (ex *Spruce*); pedicelli 3-3.5 cm. longi, tenues, sparsissime hirsuti; bracteolae, oblongo-obovatae, plus minusve carinatae, apice rotundatae, breviter mucronatae, extra pilis sparsissime obiectae, vel glabrae, intra glabrae, usque ad 3 cm. longae et 1.2 cm. latae, usque ad apicem fere margine agglutinatae. *Calyx* annularis, brevis. *Antherae* thecis basi breviter barbatis exceptis glabrae; antherarum posticarum thecae basi altera longior altera brevior, anticarum subaequales; pollinis granula circiter 48  $\mu$  diametro. *Ovarium* glabrum; stylus apice subinaequaliter breviter bifidus, glaber.

VENEZUELA. River Casiquiare; Vasiva and Pacimoni, fl. Jan., *Spruce* 3285.

#### *Species dubiae.*

**Mendoncia Riedeliana**, *Nees* in DC. Prod. xi., p. 51 (1847). *Mendozia Riedeliana*, *Nees* in Mart. Fl. Bras., vol. ix., p. 12 (1847).

**Mendoncia Schottiana**, *Nees* in DC. Prod. xi. p. 51 (1847). *Mendozia Schottiana*, *Nees* in Mart. Fl. Bras. vol. ix., p. 12 (1847).



*Mendoncia Meyeniana*, Nees in DC. Prod. xi., p. 51 (1847)  
*Mendoncia Meyeniana*, Nees in Mart. Fl. Bras. vol. ix., p. 11  
 (1847).

*Mendoncia Perottetiana*, Nees in DC. Prod. xi., p. 53 (1847).  
*Mendoncia Sellowiana*, Nees, var. *Perrottiana*, Miquel, Stirp.  
 Surinam, Select., p. 128 (1850).

*Mendoncia racemosa*, Nees in DC. Prod. xi., p. 54 (1847).  
*Mendoncia racemosa*, Ruiz et Pav. Syst. Veg. Flor. Peruv. et  
 Chil., p. 158 (1798); Pers. Synops. 2, p. 175 (1807).

*Engelia towarensis*, Kl. et Karst ex Nees in DC. Prod. xi.,  
 p. 721 (1847).

*Engelia villosa*, Kl. et Karst ex Nees in DC. Prod. xi.,  
 p. 721 (1847).

*Spécies excluda.*

*Mendoncia madagascariensis*, Radlk. in Bremen, Abh. viii.,  
 p. 467 (1884), is *Monochlamys flagellaris*, Baker in Journ. Linn.  
 Soc. xx., p. 217, tab. 26 (1883).

## XXXII.—SPECIES PLACED BY SACCARDO IN THE GENUS PHOMA.

### PART II.

W. B. GROVE.

These notes are a continuation of those which have already  
 appeared in *Kew Bulletin*, 1919, pp. 177-201, and are arranged  
 on the same plan, all figures of spores being  $\times 600$ .

Since this enquiry was undertaken with a special view to the  
 study of *Phomopsis*, it will be advisable to summarise here what  
 has been learnt further about the species of that form-genus.  
 It is now known to have three kinds of spores—A-spores (true  
*Phomopsis* spores) fusoid and averaging 8-9  $\mu$  long, on sporo-  
 phores usually longer than themselves; B-spores (*Phlyctaena*  
 spores) filiform, flexuous or bent more or less like a walking-  
 stick, on very short sporophores; and C-spores (*Fusicoccum* or  
*Septomyxa* spores) averaging 12-15  $\mu$ , fusoid and often shaped  
 like a fish deprived of fins, on long sporophores. Between the  
 first and the last intermediate forms may be observed, but the  
 two are often quite distinct and produced in separate pycnidia.  
 A and B spores have been found in the following additional  
 species:—

- Phomopsis Acanthi.*  
 „ *denigrata.*  
 „ *multipunctata.*  
 „ *occulta.*

As regards the delimitation of the species it is plain that, while there is a considerable amount of variety, the A-spores tend to a great uniformity and are in themselves of little use. But the spores as a whole, combined with the variations in external appearance, and in the nature of the *Diaporthe* to which the *Phomopsis* belongs, enable one to delimit the species with fair success. Yet it is also plain that, until the forms of *Phomopsis* are all correlated with their ascophorous stage, it will be necessary in many cases to rely on the host-plant for their identification.

Further, there is sufficient evidence to make it highly probable that the same species can attack any part of the same plant, not only stems and branches, but twigs, petioles, leaves, fruits, and even galls.

Thus such a "species" as *P. petiolorum* (Desm.), supposed to be confined to petioles, is an absurdity which must now be given up. Its various forms must be assigned to one of the species of *Diaporthe* that infest each particular host. A similar statement may be ventured, among others, of *P. glandicola* on acorns, and *P. pterophila* on ash-keys; as knowledge becomes more accurate, we may expect these to be proved to be forms of some species on oak and ash respectively.

Some authors would take us further still in this simplifying process. It is known to all mycologists that the genus *Diaporthe* was divided by Nitschke and Saccardo into three subgenera:—(1) *Chorostate*, with clustered perithecia, (2) *Euporthe*, with scattered or gregarious perithecia immersed in the wood, and (3) *Tetrastaga*, with similar perithecia immersed in the bark; and it was held by Saccardo that two species belonging to different subgenera were different from one another, even though they occurred on the same host. If, therefore, a *Phomopsis* belonged to a *Euporthe*, it was considered to be different from a *Phomopsis* that belonged to a *Chorostate* or a *Tetrastaga* on the same plant. A good illustration is seen in *P. oncostoma* and *P. pseudacaciae*, on *Robinia* (see *supra*, p. 179). But if von Höhnelt had his way (Annal. Mycol. 1918) all this would be altered, and the three subgenera would be considered to be growth-forms merely. Thus the same species, on the same host, might have a *Chorostate* form, a *Euporthe* form, and a *Tetrastaga* form.

Nor is this the climax. He goes further and considers that, not genera, but families, should be the biological basis of distinction. Thus all the species of *Diaporthe* (and consequently of *Phomopsis*) on *Sambucus*, *Viburnum*, *Lonicera*, *Symphoricarpos*, and *Leycesteria*, should be classed together under the title *D. spiculosa*, Nits. This is lumping with a vengeance, and probably few would be ready to go so far, without more evidence.

It must be remembered that, with one exception, no cultures of these genera have yet been made. Only let our friends, the petri-dish laboratory culturists, get to work and, judging by what we see in that line to-day, the tendency will be very much the reverse of von Höhnelt's. The nine or ten species on Caprifoliaceae, lumped by him under *D. spiculosa*, Nits., would more likely be split up into innumerable biological races. Luckily there is a limit to the capacity of one poor human brain: *medio tutissimus ibis*.

## SPECIES TO BE TRANSFERRED TO PHOMOPSIS.

764. *Phoma acanthina*, Sacc. & Roum.

This is now called *Macrophoma acanthina*, Berl. & Vogl. in Syll. Addit. p. 308, and nothing more is known concerning it. It can hardly be doubted that it is a young state of a *Diplodia*, but the only specimen at hand (Roum. Fung. Gall. exs. no. 1020!) shows no sign of becoming so.

But on the same sheet were two specimens of *Phoma Acanthae*, Roum. (Fung. Gall. exs. no. 717) which obtruded themselves at once upon the eye as representing a *Phomopsis*, and on examination turned out to be evidently the same as *Phoma Acanthi*, Sacc. & D. Sacc. (Syll. xviii. 257); they agreed with the description in detail, but showed A and B spores, not A spores only, as Saccardo's did.

## PHOMOPSIS ACANTHI, Grove.

*Phoma Acanthi*, Sacc. & D. Sacc. Annal. Mycol. 1905, p. 166.

*Phoma Acanthae*, Roum. Fung. Gall. exs. no. 717!

Pycnidia gregarious and arranged more or less longitudinally along the stem, occupying partly a large oblong bleached spot, but also extending on to the darkened (rufous-fuscous) parts surrounding it, oblong-lanceolate, 500–750  $\mu$  diam., blackish-brown, surrounded by a faint brownish stain, depressed, mouthless or opening irregularly, the apex of each pycnidium where it will open being marked by a pale dot, due to the loosened epidermis. A-spores ellipsoid, about  $7 \times 2 \mu$ ; B-spores about  $20 \times 0.75 \mu$ , both on short sporophores. (Fig. 1, a.)

On dead stems of *Acanthus mollis*, Rome and Perpignan.

Probably the pycnidial stage of *Diaporthe picea* f. *Acanthi* (Sacc. Syll. i. 648). Pycnidia very imperfect, often represented merely by the darkened epidermis. As Saccardo remarks, the pycnidia occur on both the bleached and the darkened portions of the stem.

768. *Phoma Veronicae*, Roum.

On this exsiccatum (Roum. Fung. Gall. exs. no. 2960) there are three fungi in the Kew exemplar. The first is that named above, a true *Phoma*; the second is a *Pleospora*, to which doubtless the *Phoma* belongs, and the third is a form of *Phomopsis hysteriola*, which, since that species is not well understood, had better be described here:—

## PHOMOPSIS HYSTERIOLA, Grove.

f. *Veronicae* nov.

Pycnidia imperfecta, atra, lentiformia vel subglobosa, papillata, in maculis dealbatis singula vel seriata disposita, subter fibrillas ligni nidulantia (corticis partibus et superiore et interiore dilapsis) easque rima singula vel pluribus parallelibus diffidentia, tandem emergentia, halone leviter nigrescente cincta. Sporulae copiosae, lanceolati-ellipsoideae, altero saltem apice acutatae, 1–3-guttulatae, saepius curvatae vel flexae,  $6-8 \times 2-3 \mu$ , sporophoris subulatis, curvulis, 10–12  $\mu$  longis, e strato molli pallide fuligineo oriundis suffultae.

*Hab.* in caulibus emortuis *Veronicae spicatae*, Grand Quevilly Galliae (Roum. Fung. Gall. exs. no. 2960!).

This species is distinguished from *P. striaeformis*, Dur. & Mont., under which Saccardo places it, by its occurrence on herbaceous stems where it forms little linear groups, hidden at first under the blackened fibres of the wood, and at length splitting them apart in an hysteriiform fashion. Varieties of the same species occur on *Atropa* and *Chacrophyllum*.

773. *Phoma Marrubii*, Sacc.

PHOMOPSIS MARRUBII, Grove.

*Sphaeronema Marrubii*, Dur. & Mont. Flor. Alg. p. 580.

Pycnidia gregarious on bleached spots, black, up to  $250\ \mu$  diam., imperfect, lens-shaped, depressed, covered by the epidermis, each surrounded by a faint blackish stain and without any pale spot in the centre. Spores oblong-lanceolate, curvulous, acute below,  $8-10 \times 2.5\ \mu$ ; sporophores subulate, curvulous,  $18-20 \times 2\ \mu$ , rising from a dusky-olive stratum.

On dry dead stems of *Marrubium vulgare*, Toulouse (Roum. Fung. Gall. exs. no. 2120!).

The bleached spots resemble those of *P. albicans* and *P. hysteriola*, f. *Veronicae*, but the pycnidia are slightly different and in the latter species are differently arranged. The description in Flore d'Algérie is obviously that of a *Phomopsis*, all the external points that distinguish the genus being unconsciously recorded.

778. *Phoma denigrata*, Desm.

PHOMOPSIS DENIGRATA, Trav. Flor. Ital. Crypt. ii. 230.

*Phoma denigrata*, Desm. in Ann. Sci. Nat. 1853, xx. 218.

Pycnidia loosely scattered more or less along the entire stem, which is blackened over the whole occupied part,  $250-350\ \mu$  long, convex, irregular, longitudinally placed, black, immersed, then erumpent by the shining black papilla; pycnidial wall hard and thick above, and sometimes the whole upper part falls away as described in other species, leaving a whitish pit behind. A-spores, "fusoid, biguttulate,  $10-12 \times 3.5-4\ \mu$ " (Sacc.): B-spores filiform, curved or hamate,  $20-22 \times 1\ \mu$ , on short ampulliform sporophores: C-spores broadly fusoid or fish-shaped, very acute at both ends, pluriguttulate,  $12-15 \times 3.5-4\ \mu$ ; sporophores subulate, curvulous, but never hamate, a little longer than the spore or half as long again, rising from a dusky proliferous stratum. (Fig. 1, b.)



Fig. 1. a, *Phomopsis Acanthi*, from Roum. no. 717; b, B and C spores of *P. denigrata*; c, A and B spores of *P. multipunctata*.



On dead stems of *Prunella vulgaris* (Desm. Crypt. Fr. sér. ii. no. 353!). No doubt the pycnidial stage of *Diaporthe Desmazieri*, Niessl, which sometimes occurs with it. The latter has been found in Britain (*Diaporthe Labiatae*, Cooke in Grevill. v. 63), but the *Phomopsis*-stage has not yet been recorded here.

The same *Phomopsis* was issued by Vestergren (Micromyc. rarior. sel. no. 64!), on stems and leaves of *Prunella grandiflora* in Sweden. Since the leaf-form differs externally somewhat from the stem-form, a description is appended:—

Pycnidia on the fading leaves, epiphyllous, densely scattered, but the leaf is not blackened, round, convex-depressed, 250  $\mu$  diam., piercing the epidermis by the papilla, but less prominent than on the stem. The proliferous stratum is much yellower, but all the spores are the same.

B and C spores could be found in abundance in each pycnidium, but no certain A-spores could be found and their description is copied from Saccardo. Desmazières gives the A-spores as "oblong, straight, subfusiform, about  $10 \times 3 \mu$ "; what Saccardo's description represents is doubtful, perhaps a confusion of A- and C-spores. There seems to be a tendency for the C-spores to become 1-septate.

This species is recorded by Diedicke on *Melampyrum*, *Euphrasia*, and *Odontites*, as well as on *Prunella*.

#### 779. *Phoma multipunctata*, Sacc.

PHOMOPSIS MULTIPUNCTATA, *Died.* Annal. Mycol. ix. 26.

Pycnidia crowded, arranged more or less in lines along the stem, oblong, convex, 500–700  $\mu$  long, imperfect, very black, covered by the epidermis; then opening by an impressed pore, each pycnidium surrounded by a faint black stain. A-spores elliptic-fusoid or oblong, often acute at one end, but also often obtuse at both ends, bi-tri-guttulate,  $6-8 \times 1.5-2 \mu$ ; sporophores subulate, acute, 10–12  $\mu$  long: B-spores filiform, flexuous or hamate, 15–20 (or occasionally 24)  $\times 1-1\frac{1}{2} \mu$ , on short sporophores. (Fig. 1, c.)

On dead stems of *Lamium album*, Padua (Mycoth. Ven. no. 1545!). Not Roum. Fung. Gall. exs. nos. 5274! and 5549! (f. *major*), neither of which at all resembles Saccardo's specimens.

A very typical *Phomopsis*, recognisable as such at a naked-eye view. No doubt the pycnidial stage of *Diaporthe Tulasnei*, Nits. f. *Lamii*; it bears a close resemblance to *Phomopsis Solani*, Grove, which is also possibly a stage of the same *Diaporthe*, but, in view of the total absence of cultural experiments, the external differences are sufficient to justify their separation for the present.

#### 792. *Phoma Spiraeae*, Desm.

PHOMOPSIS SPIRAEAE, *Grove*.

Pycnidia gregarious, arranged longitudinally on the stem, oval, imperfect, shining, black, 250–500  $\mu$  long, immersed, not prominent, at length opening by an impressed pore, each surrounded by a brownish halo and sometimes in the midst of an

effused blackish *Diaporthe*-like stain. Spores oval-oblong or even subcylindric, but often strictly fusoid, mostly acute at both ends, occasionally rounded above, biguttulate,  $8-10 \times 2.5-3 \mu$ ; sporophores subulate, pointed,  $12-15 \mu$  long, with a base  $2.5-3 \mu$  wide, rising from a dark-olivaceous stratum. (Fig. 2, a.)

On dead stems of *Spiraea Aruncus*, France (Desm. Crypt. Fr. sér. i. no. 481!; Roum. Fung. Gall. exs. no. 1109! p.p.). Undoubtedly the spermgone of *Diaporthe Lirella*, Fekl.

When old the upper part of the pycnidium disappears, as often happens in some species of *Phomopsis*; they may then look like an old *Leptostroma*. The sporophores seem to lengthen after they have lost their spore, and look like "paraphyses"; in fact such structures have often been called by that name, both in the Coelomycetes and in the Uredinales. The British specimens on *Spiraea Ulmaria*, Kew Gardens, recorded by Cooke under the name *Phoma Spiraeae*, are mixed with *Leptostroma spiraeinum* Vest. (which Cooke mistook for *Diaporthe Lirella*), but they are certainly not a *Phomopsis*.

### 823. *Phoma Phytolaccae*, Berk & Curt.

PHOMOPSIS PHYTOLACCAE, Grove, in Kew Bull., 1917, p. 66.

*Septoria phlyctaenoides*, Berk. & Curt. in Grevill. iii. 10.

*Phlyctaena septorioides*, Sacc.

*Phlyctaena vagabunda*, Desm. f. *Phytolaccae*.

Non *Phoma maculans*, Cooke, in Herb. in *Phytolacca decandra*, Marseilles.

Pycnidia densely scattered, situated beneath the bleached epidermis, oblong-hysteriiform with an impressed pore, or subglobose-depressed with occasionally a small papilla, at length erumpent by the vertex, black, up to  $400$  or  $500 \mu$  long. A-spores fusoid, more tapering below, bi-tri-guttulate,  $9-10 \mu$  long; sporophores subulate, a little longer than the spore. (Fig. 2, b.)

On dead stems of *Phytolacca*, New Jersey (Herb. Berk. no. 4702!). It has been suggested that this is the pycnidial stage of *Diaporthe aculeata*, Sacc., but see below.

The description is taken from Berkeley's original specimens. Berkeley noted at the time the resemblance of the spores to those of *Phoma pallens*, Berk. & Curt., which of course was merely the result of their being congeneric (See p. 184, *supra*).

On other specimens of this fungus (Ell. & Ev. North Am. Fung. ser 2, nos. 2552! and 2939!) equally from New Jersey, both B and C spores, in addition to the A-spores, occur abundantly as described below. It is worthy of notice that here again all attempts to find the three kinds of spores in the same pycnidium failed; A and B, B and C, as well as A and C spores could be found together, but not A, B, and C. This may depend upon the production of the spores at different periods of the life-history of the fungus, though this supposition does not entirely explain the matter.

The sketch given here, showing A and C spores growing side by side, can be exactly paralleled by one made by Berkeley on the sheet of his specimens of *Phoma mixta* on *Datura* (see p. 186, *supra*) as long ago as 1873, which shows accurately A and B spores

both rising from the same hymenium—a remarkable fact considering the time when it was done.

B-spores filiform, flexuous or mostly hamate,  $22-25 \times 0.5-0.75 \mu$ , on very short sporophores.

C-spores fusoid or fish-shaped, acute at both ends, pluriguttulate,  $12-15 \times 2.5-3.5 \mu$ , on sporophores varying from about as long to half as long again. (Fig. 2, b.)

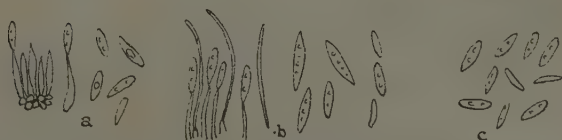


Fig. 2. a, *Phomopsis Spiraeae*; b, A, B, and C spores of *P. Phytolaccae*; c, *P. atriplicina*.

The shape of the C-spores resembles that of a fish from which all the fins have been removed. If they stood alone they would pass for a *Fusicoccum*, as in *Diaporthe leiphaemia*, Sacc. But, in some pycnidia, every possible length of spore between 10 and  $15 \mu$  could be found, although A and C spores were usually separated.

It will be noted that Berkeley describes the pycnidia of his *Septoria phlyctaenoides* (l.c.) as "hysteriiform"; such pycnidia do occur on the same stems side by side with the lens-shaped papillate pycnidia, but on examination both kinds were found to contain exactly similar spores. Saccardo notes (Syll. iii. 139) the presence of two kinds of spores (A and C), just as Berkeley did of the A and B spores on *Datura*, but in both cases without realising their significance.

Since *Diaporthe (Eu.) aculeata* (Schwein.) is common in the same region as the *Phomopsis*, and occurs with it, they are probably connected, though this would contradict the theory expressed *supra*, p. 179.

### 830. *Phoma atriplicina*, Westd.

*PHOMOPSIS ATRIPLICINA*, Grove.

Pycnidia gregarious, arranged more or less longitudinally on the stem, oval-oblong,  $300-500 \mu$  long, convex, black, covered by the blackened epidermis which is at length pierced by the small black papilla; when mature the blackened epidermis forms a halo round the pycnidium, finally the whole of the upper part falls away and leaves a dingy-white pit. Spores fusoid, acute at both ends, biguttulate,  $8-9 \times 2.5 \mu$ ; sporophores subulate,  $12-20 \mu$  long. (Fig. 2, c.)

On stems of *Atriplex hortensis*, Belgium (Westd. Herb. Crypt. Belg. no. 1233!).

On stems of *Kochia prostrata* there is f. *Kochiae* (Roum. Fung. Sel. Gall. no. 514!) mixed with other fungi, notably *Camarsporium Roumegueri*, var. *Kochiae*, Sacc. But Roum. Fung. Gall. exs. no. 859!, and Fung. Sel. Gall. exs. no. 214! are both quite different, though under the same name.

Diedicke seems to regard a *Phomopsis* on *Atriplex* as belonging to *Diaporthe picea*, Sacc.

### 835. *Phoma macropyrenia*, Thüm.

On the Kew exemplar of Thümen's *exsiccatum*, named in his writing "*Phoma macropyrenium*, Thüm. nov. spec.," are three fungi, all black and all somewhat similar, intermingled, but differing from one another in the character of the spores and sporophores.

The first is that intended by Thümen; a true *Phoma*, having an all-round pycnidium with a wall about one cell thick.

## I.—*PHOMA MACROPYRENIA*, Thüm.

Pycnidia gregarious, immersed, covered by the epidermis, then erumpent, subsuperficial, globose, about  $100\ \mu$  diam., black, pierced at the vertex by a minute impressed pore; texture truly *Phoma*-like, brown, parenchymatous. Spores ellipsoid, oblong, or subcylindrical, rounded and scarcely subacute at both ends, at times somewhat curvuluous,  $6.8 \times 2.5\text{--}3\ \mu$  (or rarely  $10\ \mu$  long), rather variable, and having, apparently, in many cases, as Thümen says, "two large nuclei," i.e. guttules, one at each end. On closer examination, however, it is seen that this appearance is caused by what Berkeley used to call "a retraction of the protoplasm to either end," leaving a kind of vacuole in the middle. No perceptible sporophores: one spore was seen which appeared to have a median septum. (Fig. 3, a.)

On dead stems of *Ricinus communis*, Coimbra, Portugal, legit Moller (one of the original specimens issued by de Thümen in *Flora lusitanica*).

The specimens issued by Roumeguère under the same name (in Fung. Gall. sel. no. 4349!), from Luchon, are quite different.

The second fungus is a *Phomopsis*, which is different from *Phomopsis Ricini* described below; it may belong to *Diaporthe spiculosa*, var. *Ricini*, Trav. (Flor. Ital. Crypt. Fung. ii. 244) which should, it seems, be considered distinct from *D. spiculosa*, Nits.

## II.—*PHOMOPSIS PRAETERVISA*, sp. nov.

Pycnidia copiosa, subgregaria, nec conferta, atra, rotundata, apice pertusa, interdum confluentia, ca.  $250\ \mu$  diam., velata, dein erumpentia, denique parte superiore crassa dilapsa discum incusum atrum opacum epidermide fracta cinctum relinquuntia. Sporulae copiosae, cylindraceo-ellipsoideae vel fusoidae, utrinque subacutae, 1-2-parviguttulatae,  $8.10 \times 2.2.5\ \mu$ , sporophoris stipitatis, subulatis, erectis, achrois, apice saepe acutis,  $16.20 \times 1.5\text{--}2\ \mu$ , e strato dilute olivaceo oriundis suffultae. (Fig. 3, b.)



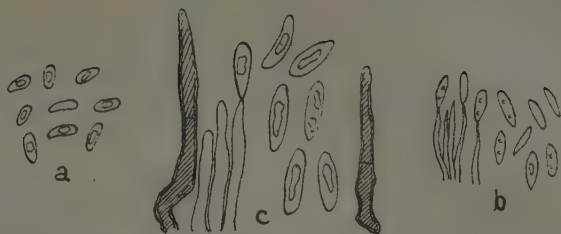


Fig. 3. *a*, *Phoma macropyrenia*; *b*, *Phomopsis praetervisa*; *c*, *Colletotrichum*, all from Moller's specimen.

*Hab. ibidem.* The "perithecia" described by Thümen seem to be a confusion of these two species.

This *Phomopsis* differs from *P. Ricini*, Gr. in (1) the epidermis not blackened over the pycnidium, (2) each not being surrounded by a black stain, (3) the upper part falling away and leaving a disc (*see below*, p. 437).

III.—The third fungus, which is small in quantity, is a *Colletotrichum*, very like *C. gloeosporoides*, Penz. or *C. Malvarum*, Southw. It has spores longer and more cylindric than those of the two just described,  $14-18 \times 4-4.5 \mu$ , filled with granular protoplasm, and provided occasionally with an irregular guttule: the sporophores are pale-brownish, oblong, crowded, obtuse at apex,  $20-35 \times 3-4 \mu$ , rising from a thick soft yellowish-brown stratum of minute parenchymatous cells. The proliferous stratum is surrounded by a small number (15-20) of inconspicuous brown hairs of the usual kind,  $40-60 \mu$  long. (Fig. 3, *c*.)

### 836. *Phoma Euphorbiae*, Sacc.

PHOMOPSIS EUPHORBIAE, Trav. l.c. p. 233.

Pycnidia occupying little oblong-sinuous dark-grey (not black) areas of the stem, covered by the epidermis, greyish-black, about  $180 \mu$  diam. Spores oblong-ellipsoid, rather obtuse at both ends, often biguttulate,  $6-7 \times 2-2.5 \mu$ ; sporophores crowded, acicular,  $12-14 \times 1.5 \mu$ .

On stems of *Euphorbia Characias*, Collioure, France (Roum. Fung. Gall. exs. no. 1105!). On stems of *Euphorbia palustris*, Birmingham. The pycnidial stage of *Diaporthe Euphorbiae*, Cooke.

### 871. *Phoma lathyrina*, Sacc.

PHOMOPSIS LATHYRINA, Grove.

Pycnidia gregarious, orbicular, convex or globose-depressed, covered but rather prominent, black, somewhat shining, up to  $400 \mu$  diam., surrounded by a dull blackish halo, and sometimes two or three enclosed by a sinuous *Diaporthe*-like line, at length dropping out and leaving a paler pit; texture thick above, blackish-brown. Spores oblong-ellipsoid, subobtuse at both ends, often biguttulate, sometimes inequilateral,  $8-10 \times 2-2.5 \mu$ ;

sporophores crowded, erect, acicular,  $16-20 \times 1-1.5 \mu$ , rising from a thick brownish stratum.

On dead pods of *Lathyrus silvestris*, Padua (Mycoth. Venet. no. 1542!).

A true *Phomopsis*, but no *Diaporthe* on *Lathyrus* seems to be known. The halo is due to dark creeping fibres. Cf. *Diaporthe inaequalis*, Nits.

893. *Phoma occulta*, Sacc.; and 894. *Phoma conorum*, Sacc.

The investigation of the specimens placed under these heads disclosed a "Comedy of Errors" which took a considerable time to unravel. Westendorp published, in Herb. Crypt. Bot. Belg. no. 913!, under the name "*Sphaeria conorum*, Desm.," a species on cone-scales of *Picea excelsa* which was not that of Desmazières, but was *Diaporthe occulta*, (Fckl.) Nits. This error was discovered by Niessl, who pointed out (in Hedwig. 1876, p. 1) that Desmazières' species was on cones of Pine and was stated by him (Ann. Sci. Nat. 1846, xvi. 76) to have ascospores measuring  $8.3 \mu$  long, while the specimens of Westendorp, Niessl said, had spores  $12 \mu$  long or more.

This correction, however, made matters worse. An examination of the Kew example of Desmazières' own co-type exsiccatum (*Sphaeria conorum*, Desm. Crypt. Fr. no. 1773!, on the rhomboidal apophysis of cone-scales of *Pinus silvestris*) shows that it possesses well-developed asci containing spores that measure  $12-14 \mu$  long, and are therefore practically indistinguishable from those of *D. occulta*. But the same exsiccatum also contains, glued on the paper by Desmazières, other scales on which were spermo-gones, with spores measuring about  $8 \times 3 \mu$ . These are what should rightly be called *Phomopsis conorum*; evidently Desmazières gave the length of these pycnidial spores instead of that of the ascospores.

Saccardo, taking Niessl's word for it, introduced this mistake into the Sylloge (i. 647), and thus misled later mycologists. So when Muller found at Eastbourne a *Diaporthe* on cone-scales of Pine, having spores  $12-14 \times 4 \mu$ , it was of course concluded by Cooke that this was *D. occulta*, instead of being as it is, *D. conorum*; so far, ascophorous *D. occulta* has not been noticed in Britain, although the late Dr. J. W. Ellis discovered the *Phomopsis*-stage at Malvern and Dolgelley.

The description of *D. occulta* in Saccardo (p. 647), taken from Nitschke, is, like all that Nitschke wrote, very accurate and complete; but as that of *D. conorum* (*ibid.*) is incorrect, a description taken from Desmazières' specimens is given below. It appears that, though the spores are so similar, the fungi differ much in outward appearance, as well as in host.

#### DIAPORTHE CONORUM (Desm.).

Stromata 3-5 mm. across, angular, distinctly limited, usually deep-black and shining outside; within, the matrix is undiscoloured but bordered by a black line. Perithecia globose, about  $250 \mu$  diam., gregarious; immersed and at first hidden, but at length bursting the epidermis and protruding slightly, showing

a short black papilla surrounded by an erect collar. Asci about  $45 \times 8 \mu$ ; spores biseriate, fusoid, subacute at both ends, 4-guttulate,  $12-14 \times 3.5-4 \mu$ , remaining for a long time eseptate.

On the apophysis of the cone-scales of *Pinus silvestris* (Desm. Crypt. Fr. no. 1773!).

Distinguished at once from the fully developed state of *D. occulta* by the absence of the long cylindrical ostioles of the latter; in *D. occulta* the stroma is outwardly brownish-black and opaque; in *D. conorum* it is mostly shining and inky-black—in both it is bounded within by a narrow black line. The difference of host seems, so far as known, to be constant, but that question must be left for the future to decide.

Let us assume that it is constant. Then it is plain that *Phoma conorum*, Sacc. (Syll. iii. 150), since it is on "*Abies*," is not the spermogone of *Diaporthe conorum* (Desm.), as Saccardo asserts. Moreover it does not agree with Desmazières' own exsiccatum, named "*Sphaeria conorum*, Desm." It is really one of the spore-forms of *Phomopsis occulta*, Trav. (see below).

Of *Phomopsis conorum* (Desm.)? Died. not enough was found to justify description at present, except that the spores are ellipsoid and measure  $8-9 \times 2.5-3 \mu$ . Of *Phomopsis occulta* Trav. three spore-forms were seen.

#### PHOMOPSIS OCCULTA, Trav. l.c. p. 221.

A-spores—Pycnidia roundish or more often oblong,  $200-250 \mu$  long, black, imperfect, immersed, convex, then bursting the epidermis above for the most part in an hysteriiform manner, often arranged more or less in lines; texture rather thick above; the epidermis all round is faintly stained with blackish longitudinal streaks. Spores numerous, narrow-oblong, somewhat sausage-shaped, curved in profile view, rounded above, obliquely apiculate below, at times faintly biguttulate,  $9-10 \mu$ , then  $10-13 \times 2-2.5 \mu$ , when mature; sporophores crowded, filiform, acute at apex, usually straight,  $12-15 \times 1-1.5 \mu$ , rising from a soft brownish stratum.

On outer surface of cone-scales of *Picea excelsa*, at the tip, Nannau Park, Dolgelley (Ellis). (Fig. 4, a.)

Except that the spores are longer (? more mature), these specimens are much like those described by Fuckel (Nachtr. iii. 23). He did not issue any dried specimens of the spermogones, but observes that they occurred on the outside of the scales, on the same stroma which, on the inside, produced the ascophorous perithecia.

Here it should be noted that Fuckel (? in error) records (Symb. Myc. p. 210) the host of his *Valsa occulta* (Fung. Rhen. no. 622) as *Pinus excelsa*, whereas the scales in the exsiccatum are obviously those of *Picea excelsa*, or as he calls it thereon "*Pinus Abies*."

Those who have to examine the exsiccata issued by Roumeguère are aware that they are very disappointing, being frequently badly named and often deficient in quantity. But in this case it was decidedly different, for his exsiccatum no. 1727, under the name "*Phoma* (*Diaporthe*) *conorum*, Sacc. *Sphaeria* Desm.

West. H. C. no. 913, " which is on "*Abies*," surprisingly yielded both the B and C spores of *D. occulta*.

B-spores—Pycnidia gregarious, immersed, thick-walled above, convex, black, erumpent in short hysteriiform groups. Spores numerous, filiform, but thickened subclavately upwards, falcate or hamate, obtuse at apex, much attenuated below, pluriguttulate in the upper half,  $32-40 \times 2 \mu$  at the widest part; sporophores short, papilliform, rising from a thick soft pale-brownish stratum. (Fig. 4, b.)

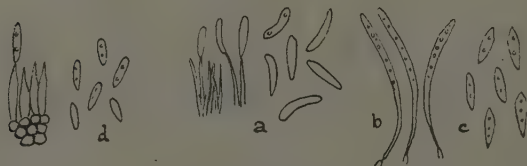


Fig. 4. a, A-spores; b, B-spores; c, C-spores of *Phomopsis occulta*; d, *Phomopsis Ricini*.

The same exsiccatum (Fung. Gall. exs. no. 1727!), as well as *ibid.* no. 1735! (under the name "*Phoma strobilina*, Desm. Pl. Cr. Fr. 1876") on the same host, yielded the C-spores.

C-spores—Pycnidia imperfect or rather with no evident pycnidial wall, convex, irregular, for the most part appearing mouthless, black, rugulose, often erumpent in an hysteriiform manner, surrounded by the laciniae of the epidermis. Spores fusoid, fish or torpedo-shaped, acute at both ends, with one or more guttules,  $10-14 \times 2-3 \mu$ ; sporophores acicular,  $10-15 \times 1 \mu$ , rising from a thick brownish stratum. (Fig. 4, c.)

It will be noticed that these spores are exactly what Saccardo describes for his *Phoma conorum* (Syll. iii. 150); his "basidia uncinata,  $24 \times 1 \mu$ " are no doubt the B-spores, though they seem more like the usual B-spores of a *Phomopsis* than the unusual ones described above. Perhaps both kinds occur. The C-spores are flattened, as if cut out of thick cardboard, so that in profile they look distinctly narrower, and are often curved; in face-view they might sometimes almost be described as "coffin-shaped." There was no true pycnidium: the black mass seemed to be composed entirely of spores.

It was observed that all three kinds tend to occur in short lines, and often burst the epidermis rimosely, exactly as the ascophorous stage of *D. occulta* does at times.

## SPECIES TO BE TRANSFERRED TO DIPLODIEAE.

### 834. *Phoma Ricini*, Sacc.

*Sphaeropsis Ricini*, Cooke in Grevill. xii. 23.

*Macrophoma Ricini*, Berl. & Vogl. in Syll. Addit. p. 308.

? *Diplodia Ricini*, Sacc. & Roum. in Rev. Mycol. iii. 29. Syll.

iii. 369.



Pycnidia densely scattered, subglobose, more or less depressed, black, covered by the epidermis, then erumpent by a small papilla, at length nearly free, up to  $250\ \mu$  diam.; texture thick, *Diplodia*-like. Spores elongate-ellipsoid or subfusoid, always colourless, cloudy within, continuous,  $15\text{--}23 \times 5\text{--}5.5\ \mu$ . (Fig. 5, a.)

On stems of *Ricinus communis*, Aiken, South Carolina (Ravenel, Fung. Amer. exs. no. 543!, and Cooke, Fung. North Amer. no. 2630!).

In all these specimens the spores are in length very variable (some only  $13\ \mu$  long, others reaching even  $30\ \mu$ ) though remaining constant in width; they are colourless, but evidently not mature, and all continuous except that in one a faint median septum could be discerned. They are closely similar to those previously treated of under the names *Phoma fusigera* and *P. fusispora* (see *supra*, pp. 191–3), and like them are strongly reminiscent of a *Diplodia*. They must all stand or fall together; in this case the *Diplodia* is probably *D. Ricini*, Sacc. & Roum., but no specimen of this was at hand for comparison.

But on the same sheet of one of Ravenel's specimens, and on the same stem which contains the "*Sphaeropsis*" just referred to, is a very different fungus:—

#### PHOMOPSIS RICINI, sp. nov.

Pycnidia dense gregaria, rotundata, convexa, ca.  $200\ \mu$  diam., atra, epidermide obscurata tecta, halone nigrescente cincta, tandem ostiolo emergentia; contextu partis superioris crasso, atro-brunneo. Sporulae fusoideae, utrinque subacutae, biguttulatae,  $7\text{--}9 \times 1.5\text{--}2\ \mu$ , sporophoris subulatis, acutis, achrois,  $12\text{--}15\ \mu$  longis, deorsum  $3\ \mu$  latis, e strato crasso atro-olivaceo oriundis suffultae. (Fig. 4, d.)

*Hab.* in stipite emortuo *Ricini communis*, Aiken Carolinae australis. It may be conjectured that this is the pycnidial stage of the South American *Diaporthe Ricini*, Speg.

#### 872. *Phoma Triacanthi*, Sacc.

*Sphaeropsis Gleditschiae*, Cooke in Grevill. vi. 134 (non Thüm.).

*Macrophoma Triacanthi*, Berl. & Vogl. in Syll. Addit. p. 310.

On the sheet bearing this name are two different fungi, but probably both belonging to the same life-cycle. The first, which is that intended by Cooke, shall be described as:—

#### I.—DOTHIORELLA GLEDITSCHIAE, Grove.

*Sphaeropsis Gleditschiae*, Cooke.

Pycnidia compound, forming a roundish or angular erumpent mass,  $300\text{--}500\ \mu$  diam., black, convex, with a thick texture of minute dark-brown parenchymatous cells; cavity divided into several pseudo-locelli by paler translucent walls. Spores quite cylindrical, obtuse at both ends or faintly acute below, straight, hyaline; sporophores similar to the spores, but shorter. (Fig. 5, b.)

On legumes of *Gleditschia Triacanthos*, Aiken, South Carolina (Ravenel, nos. 250! and 2330!).

Probably a stage of the *Botryodiplodia* referred to below. See Journ. Bot. 1918, p. 294, and *Kew Bull. supra*, p. 188.

The other fungus, on the same sheet, shall be described as:—

## II.—HAPLOSPORELLA GLEDITSCHIAE, sp. nov.

Pycnidia in greges erumpentes confluentesque digesta, quandoque longitudinaliter seriata, atrobrunnea, ca. 300  $\mu$  lata, peridermio laciniato margine pallidiore cincta, contextu crasso parenchymatico conflata. Sporulae oblongae, utrinque rotundatae, continuae, dilute olivaceo-brunneae, plerumque 1-2-guttulatae, 16-22  $\times$  6-10  $\mu$ , sporophoris diploidioideis, oblongis, erectis, fasciculatis, achrois, apice obtusis, ca. 30  $\times$  9  $\mu$  suffultae. (Fig. 5, c.)

*Hab.* in ramulis *Gleditschiae Triacanthi* (Ravenel, no. 2380!) et in ejusdem leguminibus (Rav. no. 2347!), Aiken Carolinae australis.

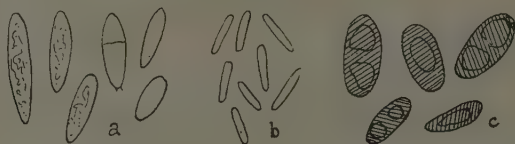


Fig. 5. a, *Sphaeropsis Ricini*, Cooke; b, *Dothiorella Gleditschiae*; c, *Haplosporella Gleditschiae*.

This cannot possibly be anything else than a young state of a *Botryodiplodia*, before the septum is developed, being exactly in the same condition as the British species which have been named *Haplosporella melogrammata*, *H. viticola*, and *H. caespitosa* (all known to be the mere states of species of *Botryodiplodia*). It is probably, therefore, = *Botryodiplodia Gleditschiae* Berl. (Sacc. Syll. x. 294), but since no specimens of that were at hand for comparison, it is recorded here under an *ad interim* name. There is every reason to believe also that the *Botryodiplodia* is a congested state of *Diplodia Gleditschiae*, Pass. (Syll. iii. 335), with *D. macrostoma*, Lév. (Syll. iii. 350) f. *Gleditschiae* as an intermediate form.

With regard to these names which are admittedly *ad interim*, pending the results of cultures to be carried out by the younger generation, it may be remarked that, so long as they are recognised to be what they are, they are a help rather than a hindrance. For many of these Imperfect Fungi occur so widely and so persistently in the unfinished state that, if no definite reference is made to that state, one who is not expert in the subject may easily go astray. It seems, therefore, a mere common-sense business precaution to list them under the preliminary name, always of course with cross-references as in a library catalogue. This does no harm except in the minds of believers in the sacrosanctity of Linnean binomials. We do not call the "fruit of an oak-tree" by that name, but "an acorn."

## SPECIES TO BE TRANSFERRED TO HYALODIDYMAE.

831. *Phoma Rheea*, Cooke.

ASCOCYTA RHEAE, Grove.

Pycnidia scattered, round, covered by the epidermis, then emergent by the upper half, about  $300\ \mu$  diam., blackish, at length falling away and leaving a little white pit; texture thin, soft, plectenchymatous, brown. Spores oblong-ellipsoid, somewhat obtuse at the ends, biguttulate, for a long time continuous, at length 1-septate, not constricted,  $7-9 \times 3-3.5\ \mu$ ; sporophores about as long as the spore.

On dead stems of *Boehmeria nivea*, Assam and Kew Gardens.

The British specimens correspond exactly with those from Assam, no doubt having been introduced with the plant. Only a few of the spores were distinctly 1-septate, but many showed indications of becoming so. This species might be placed in *Diplodina*, but it has the pycnidial texture of an *Ascochyta*; the distinction between the two genera should lie in the texture of the wall of the pycnidium, not in the nature of the habitat.

884. *Phoma cucurbitalis*, Berk. & Curt.

Spots none. Pycnidia gregarious, subglobose, flattened, erumpent and at length somewhat superficial, black, shining, about  $100\ \mu$  diam., with a minute ostiole in the centre; texture of brown polyhedral cells, truly *Phoma*-like. Spores ovoid, rounded at the ends, biguttulate,  $5-7 \times 2-2.5\ \mu$ ; sporophores obsolete.

On seeds of *Citrullus*, South Carolina (Herb. Berk. no. 5033!).

Though all the spores seen were continuous, there were not wanting indications (as by the constriction of numerous spores in the middle) that they would ultimately become 1-septate. The species would then belong to the genus *Diplodina*.

SPECIES TO BE TRANSFERRED TO  
LEPTOSTROMACEAE.842. - *Phoma hysteriiformis*, Cooke.

Pycnidia black, up to  $500\ \mu$  long, densely gregarious and frequently confluent, forming an elongated *Hysterium*-like tubercle; mycelium arising in the epidermal cells, covered at last only by their outer walls, but penetrating deeply into the mesophyll, composed of thick-walled dark-brown parenchymatous cells, somewhat radiating at the margin, enclosing a cavity which is lined by the sporophores above and below. Spores more or less ellipsoid, obtuse at both ends, colourless, cloudy within,  $12-14 \times 4-6\ \mu$ ; sporophores short, oblong, erect, obtuse at apex, pale brownish, sometimes transversely septate below, reminding one of those of *Piggotia astroidea*, B. & Br. (Fig. 6, a.)

On an herbaceous stem, Houston, Texas, legit Ravenel (Cooke, North Amer. Fung. no. 224!).

Externally very like the less crowded specimens of *Placosphaeria Onobrychidis*, var. *anaxaea* (Speg.) Keissl., as issued by

Keissler, but not like the description of *Phoma anaxaea*, Speg. (Syll. iii. 121) to which he assigns it, but of which, it is true, neither Keissler nor I have seen a specimen. Saccardo seems to be in error in regarding the latter as the spermogone of a *Diaporthe*. The fungus is also somewhat similar to specimens of *Placosphaeria Balanseana*, Sacc. & Roum. (Syll. x. 237), in external appearance. But since each stroma contains only one spore-bearing cavity, it must belong rather to the Leptostromaceae: *Placosphaeria* has numerous dothideoid cavities in each stroma, though I believe that it is more akin to the Leptostromaceae, than to the Sphaerioideae where Saccardo places it.

In view, however, of the confusion in which the Leptostromaceae now stand, with the generic limits perfectly undefined, it is useless to assign the present species to a genus. The whole group requires thorough re-examination, a long and arduous task. Thus under *Leptostroma herbarum*, Fr., we find placed by various authors species presenting at least three or four types of pycnidium, nor can these be disentangled by any other means than by examining their vertical sections.

It is known that some *Leptostromaceae* arise *between* the cuticle and the epidermal cells, others arise *within* the epidermal cells, which they ultimately destroy. The process by which the stroma arose in the present species could be clearly followed. The purplish-brown hypha starts in a single epidermal cell, branches and fills that cell with pseudo-parenchyma, then grows through the pits into the neighbouring cells, where it again branches and continues the process. Finally there is produced a cluster of epidermal cells of which the lateral walls are completely destroyed, while the mycelium also penetrates deeply into the mesophyll. Then the cuticle is burst, and round the free margin the hyphae grow outwards in a somewhat radiating fashion. Meanwhile a cavity arises in the stromatic mass, round the inside of which erect hyphae (conidiophores) produce the spores, which finally escape through a hole formed at the apex of the mass. The structure exactly resembles that of Diedicke's § A, as described for *Leptostroma Equiseti*, Jaap, and figured in his article *Die Leptostromaceen* (Annal. Mycol. 1913, xi. 177, f. 3). The name of this fungus should then be *Leptostroma hysteriiforme*, but it opens by a pore, not a slit, and therefore does not belong to *Leptostroma* in Saccardo's sense, but to *Leptothyrium*.

## SPECIES TO BE TRANSFERRED TO GLOEOSPORIUM.

### 883. *Phoma lagenicola*, Sacc.

GLOEOSPORIUM LIAGENARIAE, Grove.

*Phoma Lagenariae*, Thüm. in Contr. Myc. Flor. Lusit. ser. iii. no. 567 (1880), *non* Sacc.

There are in the Herbarium on *Lagenaria* fruits a number of specimens on which the name "*Phoma Lagenariae*, Cooke" has been written. These on examination yield numerous spores, which are evidently those of a *Gloeosporium*; there is no trace



of any pycnidial wall. The spores measure  $5-6 \times 2-2.5 \mu$ , although occasional ones reach as high as  $8.5 \mu$  long. They are all obviously the same, and agree excellently well with the description of *Phoma Lagenariae*, Thüm., of which there are unfortunately no specimens for comparison. Saccardo, who also had not seen specimens, lists Thümen's species under the name *P. lagenicola*.

The following is the description of Cooke's specimens, named "*Phoma Lagenariae*," Cooke in Herb.

Spots up to 2 cm. across, roundish or (if contiguous) angular, greyish-ferruginous, with a darker border. Pustules densely gregarious, subepidermal,  $200-250 \mu$  diam., blackish, paler in the centre where the epidermis at length bursts open. Spores ovoid or oblong, hyaline, continuous,  $5-6 \times 2-2.5 \mu$ , rarely longer, usually rounded at the ends, often with one or more guttules; sporophores subulate-acicular, acute, crowded,  $20-25 \times 1.5 \mu$ , rising from a faintly brownish stratum. (Fig. 6, b.)

On epicarp of *Lagenaria vulgaris*, Marseilles, 1873, no. 55!

There is no indication by whom it was sent to Cooke, but the writing is distinctly French. If, as seems hardly in the slightest degree doubtful, it is identical with Thümen's species, its name according to the rules must be *Gloesporium Lagenariae*; it does not agree with any other described. There are no setae visible. Thümen's species was gathered by Moller in 1879.

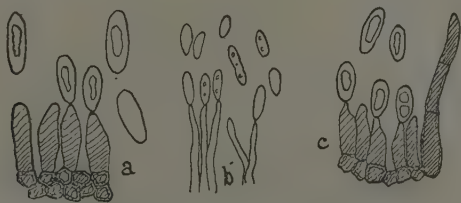


Fig. 6. a, "*Phoma hysteriiformis*"; b, "*Phoma lagenicola*", from Marseilles; c, *Colletotrichum Janiphae*.

It may here be mentioned that, though no specimens have been seen, *Phoma Lagenariae*, Sacc. (Syll. iii. 148) (*Sphaeropsis Lagenariae*, Thüm.) is according to the description merely a young state of some *Diplodia*, and the same guess might be hazarded for *Phoma Citrulli*, Berk. & Curt., and for *Phoma seminalis*, Sacc.; in fact all three may be the same species. But, to show the danger of such methods, it should be noticed that, in the same way, and apparently on equally good grounds, one might have conjectured that *Phoma Lagenariae*, Cooke was the same as *Phoma cucurbitalis*, Berk. & Curt., and this conjecture would have been wrong.

## SPECIES TO BE TRANSFERRED TO COLLETOTRICHUM.

### 833. *Phoma Janiphae*, Sacc.

COLLETOTRICHUM JANIPHAE, Grove.

*Sphaeropsis Janiphae*, Thüm. in Flora, 1878, p. 179.

*Macrophoma Janiphae*, Berl. & Vogl. in Syll. Addit. p. 307.

Pustules densely gregarious, very numerous, sub-epidermal, black, paler in the centre, roundish or subangular, nearly flat, usually 150–180  $\mu$  diam., each with a few (20–25) blackish bristles arranged round the periphery or rarely scattered over the disc; bristles short, curved or straight, tapering slightly upwards, rarely septate, dark olivaceous-brown, 30–40  $\mu$  long. Spores oval or oblong, rounded at both ends, with one or more guttules, quite hyaline, 10–13  $\times$  4–5  $\mu$ ; sporophores erect, fasciculate, oblong, cuspidate at apex, pale-brown, 12–14  $\times$  4–5  $\mu$ . (Fig. 6, c.)

On dead stems of *Jatropha Janipha* (*Manihot carthaginensis*), Aiken, South Carolina (Thüm. Mycoth. univ. no. 1191!), legit Ravenel.

The black *Phoma*-like appearance, which Thümen so mistakenly describes, is due to the coloured sporophores and subhy-menium; the black margin is due to the bristles. When the epidermis is raised in the centre, it shows as a whitish dot on the black pustule, and ultimately bursts at that point. When the pustule is older, the disc becomes quite pale, but is still surrounded by a narrow black border due to the bristles.

Roumeguère (Fung. Gall. exs. no. 718!) issued a similar fungus, from Collioure, in France, which shows pustules of two sizes. The larger appear to be merely an immature state of the *Colletotrichum*, before the bristles are developed or the spores have reached their proper shape and size. But what the smaller are, unless they are the same thing in a still earlier state (as seems probable), I do not care to pronounce: they have spores, some about 5  $\times$  3  $\mu$ , as Saccardo says (f. *microspora*, Syll. 141), but they are very variable, usually a sign of immaturity.

In a paper, which it is hoped will soon be published in this Bulletin, I have shown that *Colletotrichum* and *Vermicularia* should be kept as two distinct genera of Melanconiales, separated by the fact that in *Vermicularia* the bristles are the most conspicuous part and are often well-developed before the spores appear; while in *Colletotrichum* the reverse is the case, the bristles being as it were an afterthought, developed only as the pustule matures, so that fully-formed spores are often plentifully produced before a single bristle can be detected.

A few other species, listed by Saccardo, may now be more briefly referred to:—

### 841. *Phoma irregularis*, Sacc.

*Sphaeropsis irregularis*, Berk. & Curt. Cub. Fung. no. 563.

This name should be dropped: the type specimen (Herb. Berk.

no. 789!) yielded various irregular spores, but none like those described. Berkeley sketched some "spores" on the sheet, it is true, from which the account may be taken, but they do not look like real spores, and in the absence of all knowledge of the host the fungus can never be recognised again.

853. *Phoma minutissima*, Cooke.

*Asteroma Liatridis*, Berk. & Curt. in Herb.

This specimen, on leaves of *Liatris odoratissima*, South Carolina (Ravenel, no. 1920!), consists of a dematioid mycelium, chiefly on the upper side of the leaf, forming greyish-black oblong or oval patches, 10-11 mm. across, often confluent into large irregular blotches and dotted over with innumerable little black lumps of mycelium which are the beginnings of pycnidia or perithecia, but in which no spores could be found anywhere, although there is ample material. It cannot be recognised unless one should find it again, with the same external facies and on the same host, in a more advanced state. Meanwhile, if it is worth keeping in memory, *Asteroma Liatridis* B. & C. is the correct name: it is certainly no *Phoma*.

861. *Phoma Violae*, Westd.

The pycnidia in Westd. Crypt. Belg. no. 525! on examination are seen to be situated in sori of *Puccinia Violae* containing both uredo and teleutospores. They have exactly the same structure and texture as *Darluca Filum*, Cast., but produced no real spores, though the contents appear to be what Westendorp described as "spores." The fungus is evidently the *Darluca*, immature, and with the cavity filled with subsclerotoid tissue.

895. *Phoma arctica*, Sacc.

*Sphaeropsis arctica*, Berk. & Curt. in Proc. Amer. Acad. Arts, Sci. iv. 1858, p. 125, no. 124.

Pycnidia few, scattered, erumpent, convex, black, irregular in shape, often compressed. Spores numerous, fusoid, acute at both ends, hyaline, often biguttulate, straight in front view, curved and narrower in profile, 10-12.5  $\times$  1-2  $\mu$ ; sporophores straight, linear, hyaline, 7-8  $\mu$  long.

On outer surface of cone-scales of *Picea ajanensis*, Fisch. ex Trautvetter & Meyer. Kamtchatka (Herb. Berk.). The host was wrongly given in the original description as "*Pinus ajanensis*."

Neither a true *Phoma*, nor a *Phomopsis*. Pycnidial wall minutely parenchymatous, opening in the upper half. It is most likely that this is a form or variety of *Sporonema strobilinum*, Desm., the spores being very similar to those of that species. But the material is too small in quantity for perfect certainty.

903. *Phoma brunneotincta*, Berk. & Curt.

Berkeley gave the name *Phoma brunneotincta* to specimens in his herbarium on a Sweet Chestnut (*Castanea*) from New England. Cooke gave the same name to a fungus which grew on the inside of a dead husk of Horse Chestnut (*Aesculus*) in Kew Gardens,





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### XXXIII.—MISCELLANEOUS NOTES.

DR. J. G. BAKER.—The honorary degree of D.Sc., has been conferred by the University of Leeds upon Mr. J. G. Baker, F.R.S., late Keeper of the Herbarium and Library.

To fill the vacancy created in the post of Assistant for India in the Herbarium at Kew by the transfer of Mr. J. Hutchinson (p. 236), the Secretary of State for India in Council has re-appointed, temporarily, Mr. S. T. DUNN, B.A., F.L.S., who occupied the post from 1st April, 1901, to 21st February, 1903.

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We learn that Mr. R. S. TROUP, Assistant Inspector General of Forests, India, has been elected Professor of Forestry in the University of Oxford.

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We learn that Mr. H. R. JONES, a student in the Imperial College of Science, has been appointed Mycologist to the Ministry of Agriculture, Egypt.

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We learn that Mr. H. B. SHARPE, a former member of the gardening staff at Kew, and for some time Plant Import Inspector in the East Africa Protectorate, has been appointed by the Secretary of State for the Colonies an Assistant District Commissioner in the East Africa Protectorate.

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We learn that Mr. Alec Holm, Under-Secretary to the Ministry of Agriculture, Union of South Africa, and lately in charge of the Experimental Farm, Potchefstroom, has been appointed by the Secretary of State for the Colonies Director of Agriculture, East Africa Protectorate.

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The following appointments have been made by the Secretary of State for the Colonies on the recommendation of Kew:—

*East Africa Protectorate:—*

Mr. W. H. BIRCHENOUGH, to be Tropical Agricultural Instructor.

Messrs. F. B. BUTLER and J. SPARROW, members of the gardening staff at Kew, to be Agricultural Instructors.

Mr. C. B. USSIER, formerly a member of the gardening staff at Kew, to be Horticulturist.

*Uganda:—*

Messrs. P. CHANDLER and C. HAZEL, members of the gardening staff at Kew, to be Assistant District Agricultural Officers.

*Nyasaland:—*

Messrs. A. M. HENDERSON, T. J. SHAW, and D. PRIN, to be Agriculturists in the Department of Agriculture.

*Gold Coast:—*

Mr. W. C. FISHLOCK, formerly a member of the gardening staff at Kew, and for several years Curator of the Botanic Station in the Virgin Islands, to be a Senior Curator in the Department of Agriculture.

*Nigeria (Southern Provinces):—*

Mr. T. LAYCOCK, formerly Agricultural Inspector, to be Mycologist in the Department of Agriculture.

Mr. G. R. PIEREZ, to be an Assistant Superintendent in the Department of Agriculture.

*Ceylon:—*

Lt.-Col. F. SUMMERS, R.E., to be Economic Botanist in the Department of Agriculture.

*Federated Malay States:—*

Mr. F. DE LA MARE NORRIS, Assistant Agricultural Inspector, to be Assistant to the Director of Agriculture.

Mr. W. N. C. BELGRAVE, B.A., Assistant Mycologist, to be Plant Physiologist in the Department of Agriculture.

Mr. B. BUNTING, Assistant Agriculturist, to be Agriculturist in the Department of Agriculture.

Mr. H. H. STIRRUP, M.Sc., Assistant Agricultural Inspector, to be Assistant Mycologist in the Department of Agriculture.

Mr. W. N. SANDS, F.L.S., formerly a member of the gardening staff at Kew, and since 1899 Agricultural Superintendent in St. Vincent, West Indies (*K.B.*, 1899, 133), to be Assistant Economic Botanist in the Department of Agriculture.

Mr. F. BIRKINSHAW, Agricultural Instructor, Department of Agriculture, Mauritius (*K.B.*, 1914, 227), a former member of the gardening staff at Kew, and for some time Assistant Agricultural Superintendent, St. Vincent (*K.B.*, 1912, 350), to be Assistant Agricultural Inspector in the Department of Agriculture.

*St. Vincent:—*

Mr. T. JACKSON, formerly a member of the gardening staff at Kew, and since 1905 Curator of the Botanic Station, Antigua (*K.B.*, 1905, 60), to be Agricultural Superintendent in succession to Mr. Sands.

*British Guiana:—*

Mr. G. E. BODKIN, B.A., Economic Biologist, to be Assistant Director of the Department of Science and Agriculture.

Mr. F. STELL, of the Imperial College of Science and Technology, to be Mycologist in the Department of Science and Agriculture.

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Mr. J. C. MOORE.—We regret to learn of the retirement through ill-health of Mr. J. C. Moore, Agricultural Superintendent, Grenada. Mr. Moore entered Kew as a young gardener in 1893. In 1895 he was appointed Curator of the Botanic Station, St. Lucia, and in 1914 was transferred to the position he has now vacated.

Mr. R. IRWIN LYNCH.—After a term of close upon forty years' service as Curator of the Botanic Gardens at Cambridge, Mr. Lynch has recently retired. He entered Kew, as a young gardener, February 11th, 1867; was made foreman of the Herbaceous Department in August, 1870, and foreman of the Propagating Department in March, 1871. He left Kew in July, 1879, to take up his post at Cambridge. He was made an Associate of the Linnean Society in 1881; Veitch Medallist in 1901; Hon. M.A. (Cantab.) and Victoria Medallist in 1906. Apart from his work at Cambridge, his most important service to horticulture probably has been the improvement he effected in Gerberas by selection and hybridization. The race he established is now largely cultivated in trade establishments on the French Riviera. Mr. Lynch is now residing at Torquay.

**Taxotrophis and Balanostreblus.**—To the introductory statement which precedes the revision by Mr. Hutchinson of these two genera (*K.B.* 1918, p. 147), should be added the information that the opportunity afforded of examining the material upon which the genus *Balanostreblus* was originally based by Kurz was the result of an independent investigation by Mr. J. S. Gamble of the relationship between these two genera. This investigation was undertaken at the suggestion of the late Mr. J. H. Lace, at whose instance the material of *Balanostreblus*, Kurz, including that of the plant to which, as the notes published in 1918 show, that author's name must now be restricted, appears to have been dispatched to Mr. Gamble.

**Peace Commemoration Trees at Kew.**—In the autumn of 1917 some seeds of common oak and of horse-chestnut were received at Kew which had been collected on the battlefields of Verdun. They had been sent by the Mayor of that city to the London and North Western Railway, whose officials forwarded a few of each kind to Kew. The seeds were sown and twenty-one oaks and eight horse-chestnuts were raised from them.

In view of their interesting origin these trees appeared very appropriate to plant as memorial trees. Accordingly three of them, two oaks and one chestnut, which had been established in pots for the purpose, were planted on Peace Day, July 19th, 1919—the day of the Great Victory Procession in London. Two of them are on the southern slope of the hill which is crowned by the Temple of Aeolus, the other is between No. I. Museum and the Temple of Arethusa. Considering the interest with which these trees are likely to be regarded by future generations, when the Great War has receded into the dim past, it seems desirable to put on record the time and place of their planting.

By desire of His Majesty the King, two of these oaks and two of the chestnuts were planted at Windsor on the same day. In the public parks at Reading, under the auspices of Messrs. Sutton, two oaks were also planted. A chestnut was sent to Keswick for the same purpose.



**Nectaropetalum zuluense.**—Recently a specimen of *Erythroxyylon zuluense*, Schönl., from Ngoya Forest, Zululand, was received from Dr. E. P. Phillips, Pretoria, who suggested that it might be the same species as that described by the late Dr. Bolus as *Peglera capensis*, (Pegler 1269) and subsequently transferred by Dr. Stapf to *Nectaropetalum*, as *N. capense*. On examination it was found to be undoubtedly a species of *Nectaropetalum*, though differing from *N. capense* in the following points:—

1. The very obscure nervation of the upper surface of the leaves.
2. The length of the pedicels which measure from 5 to 8 mm. as compared with 2 mm. or less in *N. capense*.
3. The presence of a two-lobed pocket-like ligule, similar to that found in *N. Kaessneri*, Engl.

On the other hand it agrees with both *N. capense* and *N. Kaessneri* in its single style and bifid stigma, as opposed to the three (rarely four) free styles which are usual in *Erythroxyllaceae*.

It resembles *Erythroxyylon* in its striated, deciduous stipules



Explanation of text-figures of *Nectaropetalum zuluense*:—

- 1, flower; 2, petal from inside; 3, the same from outside; 4, stamens; 5, pistil; 6 and 7, fruit; 8, inside of pericarp; 9, section of seed:—
- all enlarged except No. 6.

and the presence of a well-defined appendage at the base of the lamina of each petal (fig. 2), though the appendage is much simpler than that of *Erythroxyton*, or at any rate of the African species of that genus.

So far the fruit of *Nectaropetalum* has not been known. A description of it is, however, supplied below from the material of the new species under discussion. It will supplement the original description of the genus.

*Fructus* siccus, indehiscens, ob loculum alterum vacuum collapsum specie 1-loculare; pericarpium chartaceum, intus costulis 3 notatum (fig. 8). *Semen* 1, testa membranacea; endospermium carnosum, mediocre. *Embryo* viscosus; cotyledones rotundato-ellipticae; radícula distincta.

The very great similarity of this fruit to that of typical *Erythroxyton* demonstrates clearly the close affinity of *Nectaropetalum* and *Erythroxyton* as pointed out by Dr. Stapf and Mr. Boodle in *Kew Bulletin*, 1909, p. 189.

Dr. Schönland's description in the Records of the Albany Museum being sufficiently explicit, there is no need of repeating it. It may suffice to state that, owing to its removal to *Nectaropetalum*, the name of the plant will have to be changed to *Nectaropetalum zuluense*, Corbishley.

A. G. C.

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**The Flora of Macquarie Island.**—In series C of the Scientific Reports of the Australasian Antarctic Expedition under the leadership of Sir Douglas Mawson during 1911–14, occurs one of singular interest from the pen of Mr. T. F. Cheeseman, on the Vascular Flora of Macquarie Island. This island lies over 600 miles to the south-west of New Zealand, about 920 miles south-east of Tasmania, and about 970 miles from the coast of the Antarctic continent. It lies in the same zone as South Georgia, some 5800 miles to the east, and as Kerguelen Island, 3250 miles to the east. Its greatest length is nearly 21 miles, its extreme width nearly four miles. Discovered in 1810 it was not until some 20 years later that anything was learned regarding its vegetation. About 1830 Mr. C. Fraser sent to Sir W. J. Hooker a small collection representing eight species of flowering plants which are duly recorded in Sir J. D. Hooker's 'Flora Antarctica.' As Mr. Cheeseman points out this small collection contained all but one of the conspicuous species in the vegetation of the island. Half-a-century later Dr. J. H. Scott, of Otago University visited the island to study its fauna and flora. His account of the island, published in 1883, includes a list of the plants, determined by Mr. A. C. Purdie, and Mr. Cheeseman after a critical revision of the list, finds that the number of species recorded had been raised from eight to nineteen. Another visit to the island was paid by Mr. A. Hamilton, of Otago University, fourteen years later. Mr. Hamilton's notes published in 1895, include a list of the plants determined by Mr. T. Kirk, which brings the total number of species up to thirty-two, three of which are naturalised species, while three others were regarded as endemic ones. The decision of Sir D. Mawson to make Macquarie Island

a subsidiary base for his Antarctic Expedition, enabled the making of arrangements for a systematic survey of the island and the investigation of the vegetation was, during 1911-14, entrusted to Mr. H. Hamilton, son of the distinguished biologist, who had previously visited the island in 1894. His collection includes all but two of the species obtained by Dr. Scott in 1880, and by his own father in 1914, a defect more than compensated for by the addition of four species, one of them an endemic species, not previously recorded from Macquarie Island. Mr. Cheeseman's catalogue of the species thus includes thirty-four vascular plants, of which three are finally pronounced to be endemic. Of the remaining thirty-one, fifteen, or practically one-half are common to the 'ring or zone of widely separated lands surrounding the Antarctic continent within the parallels 45° S. to 60° S.'" All but four are found in the subantarctic islands of New Zealand; eighteen of the thirty-four extend to New Zealand proper, and eleven are found in no other country. Having regard to the relative proximity of the island to New Zealand these latter facts and figures are not surprising. But the fact that twelve of the species occur in Fuegia, and that of these six should also occur in South Georgia, while eleven occur in Kerguelen—one species that Macquarie shares with Kergulen does not extend to Fuegia, two species that Macquarie shares with Fuegia do not occur in Kerguelen—calls for further consideration.

After carefully reasoned examination of the circumstances involved, Mr. Cheeseman reaches the following conclusions. The existing flora of Macquarie Island does not date further back than the close of the last glacial epoch. Since then the history of that flora, save as regards its three endemic species, has been one of plant-migration, mainly from the New Zealand outlying islands, but in some cases from the far distant Kerguelen group. If, however, Macquarie Island existed in early Tertiary times when Antarctica possessed a luxuriant flora and when in all probability geographical and climatic features co-operated in facilitating intercourse between Antarctica and the New Zealand area, the position of the island would have given it an important place in a chain of plant-migrations extending from Chile to Antarctica and from Antarctica to the north of New Zealand. Traces of such a chain are still evident in the floras of both New Zealand and South America.

D. P.

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**Flora of Aldabra.**—In a paper on the Flora of Aldabra in the *Kew Bulletin*, 1919, reference is made on p. 114 to a collection of plants from the Seychelles, Aldabra and Assumption made by Mr. Walter Fox. We now learn that this statement was based on a misunderstanding, and that the collection was *actually made by Mr. P. R. Dupont*, the energetic Curator of the Botanic Station, Seychelles, who on his return from a three months' tour in Aldabra and the neighbouring islands entrusted it to Mr. Fox, then just leaving for England. Mr. Fox delivered the collection personally at Kew, where, owing to some misunderstanding, and the absence of signed labels, it was taken to be the result of an

excursion of his own. Mr. Fox did not visit the Aldabra group of Islands, so that *throughout the paper the name DUPONT should be substituted for Fox wherever the latter occurs.*

**Root Disease in Sugar Cane.**—An interesting Report by Mr. W. Nowell, Mycologist of the Imperial Department of Agriculture, West Indies, is printed in Bulletin vol. xvii., Part 2 of the Department of Agriculture, Trinidad and Tobago, and in the June number of the Proceedings of the Agricultural Society of Trinidad on his visit paid to Trinidad to investigate the disease known as "blight" in the sugar cane fields. This trouble had been attributed to froghopper infestations, but the Entomologist in charge did not feel satisfied that the insect trouble was wholly or always responsible. Mr. Nowell found that a root-disease was generally present in unhealthy fields, and its prevalence was proportionate to the severity of the damage. This condition is induced by the invasion of the roots, the underground portions of the stool, and the young shoots by the mycelium of certain fungi that are generally saprophytic on the decaying cane material. Both the onset and the persistence of root-disease depend on a condition of weakness or debility in the cane.

It is stated that when root-disease attacks the plants the effect is that of shortage of water, the edges of the leaves curling up and the plant gradually turning brown. The stool has a characteristic stunted appearance, many shoots being dead and dry, and the trash firmly cemented around the lower joints of the cane. The system of continuous cropping, of long ratooning, of planting between the old rows, and turning the old and dead stools full of root fungus on to the new young plants, all tends to give every chance to the fungus to induce disease. Any conditions such as lack of manure, lack of moisture, lack of tilth or attacks by froghopper that weaken the plant, are contributory factors to the severity of cane blight.

Mr. Nowell points out that the parasitism of the two fungi, *Marasmius sacchari*, and an *Odontia*-like species, that are alleged to cause cane blight is in need of thorough investigation, and that the whole question of attack in the case of potential parasites is inseparably bound up with the general health of the plant, and with questions of good cultural methods. N. L. A.

**Fruit Culture in Malaya.\***—In a preface to this Bulletin by the Director of Agriculture it is stated that it "is issued in the hope that it will encourage and assist the planting of fruit trees in private gardens, particularly on estates. At present a very small proportion of gardens in the country contain anything approaching a good selection of fruit trees, and most residents depend on what can be bought in the local market." Early introduction of exotic fruits into the Peninsula was brought

\* Bulletin No. 29, 1919, of the Department of Agriculture, Federated Malay States, by J. N. Milsum, Superintendent, Government Plantations, Selangor and Negri Sembilan.



about by travellers visiting the important port of Malacca, and the first records of what was cultivated date from the close of the sixteenth century, when the Portuguese were established in Malacca. During the last century valuable introductions have been made through the Botanic Gardens of Singapore and Penang. In 1908 special attention was being given to the cultivation of fruits at the Kuala Lumpur Experimental Plantation, and in 1915 a Fruit Nursery was opened at the Batu Tiga Plantation, Selangor. It is unfortunate that the production of fruit for sale in the local markets has steadily declined with the rise of other industries, notably *Hevea* planting, since many of the large plantations of fruit trees in existence towards the close of the past century in Singapore, Malacca and elsewhere, have been abandoned. This is a matter for regret, as about 30 years ago (see *Kew Bulletin*, 1888, "Principal Fruits grown in the Straits Settlements," pp. 250-252) there was a good foundation for development. It was then recorded that "the supply of fruit is now sufficient for local wants. All the important fruits would be produced in much larger quantities if there were a market for them." At the time of the *Kew Bulletin* paper, the fruits exported in a fresh state to neighbouring countries were mainly "Mangosteens" (*Garcinia Mangostana*), "Pine-apples" (*Ananas sativa*), "Durians" (*Durio zibethinus*), "Rambutans" (*Nephelium lappaceum*). Fruits exported in a preserved state were Pine-apples in considerable quantities to Europe, China, India, etc. (340,000 tins in 1887), Mangosteens (20,000 tins), chiefly to Europeans homeward bound, and 15,000 tins of Guava jelly, Pine-apple jam, and Bread-fruit, chiefly to Europeans homeward bound. In reference to the Pine-apple industry it may be of interest to note what was said of the Singapore produce at the Colonial and Indian Exhibition in London, 1886 (see Morris, "Reports on the Colonial Sections of the Exhibition," 1887, p. 140), "The chief place is taken by the Pine-apples of Singapore, which, preserved whole in syrup, have entered into commerce and are now regularly supplied by London Stores. The Pine-apple is canned and shipped in a similar manner from the Bahamas, Fiji and Natal; but the Singapore Pine-apple has established itself as one of the best in the market." In the *Bulletin* under consideration it is stated that "no fruit appears to have been grown on a large commercial scale with the single exception of the Pine-apple, of which the cultivation for canning did not assume any importance until about 1890, when the Chinese commenced the business. Large areas of land in Singapore, formerly under Pepper, Indigo and Gambier cultivation were utilised for the production."

The author does well by encouraging a similar standard all round, and especially so by keeping in view the improvement of the local supply. There are seven chapters dealing with the past and present position of Fruit Cultivation in the Malay Peninsula, Propagation, Cultivation, Soil, Pests and Diseases, Native and Exotic Fruits, included, with a good index, in 108 pages, and illustrated with 23 plates.

J. H. H.

**Viburnum Carlesii**, var. **syringiflora**.—In the Gardeners' Chronicle for December 6th, 1919, p. 285, Mr. E. H. Wilson points out that the plant described under this name in the *Kew Bull.* 1919, p. 239, is the same as *Viburnum bitchiuense*, Makino. This species had not hitherto been represented in the Kew Herbarium, and its publication was unfortunately overlooked. It had been grown in English gardens for several years as *V. Carlesii*, and was assumed to be, like the true form of that species, a Korean plant. According to Mr. Wilson, we now know that it is a native of the mountains of the province of Bitchiu in Western Japan, where it was discovered some time prior to 1902 and named by Makino. This botanist, however, in 1909 changed his mind and identified it with *V. Carlesii*, Hemsl., thereby causing some confusion and disappointment. Mr. Wilson states that a Japanese Nursery Company, relying on Mr. Makino's conclusions, obtained the Japanese plants, propagated and exported them as *V. Carlesii*, and it was only when complaints of their inferior quality began to reach them that suspicion was aroused and the mistake discovered.

J. H.

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